Draft Environmental Impact Report: Volume I

City of Boston
Waste-to-Energy Project

EOEA Number: 4820

Project Sponsor: City of Boston, Department of Public Works

DRAFT ENVIRONMENTAL IMPACT REPORT: VOLUME I

CITY OF BOSTON WASTE-TO-ENERGY PROJECT

Prepared By: CSI Resource Systems, Inc.

December 15, 1983

EOEA Number: 4820
Project Sponsor: City of Boston, Department of
Public Works

ACKNOWLEDGEMENTS

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- Environmental Research & Technology, Inc. (air quality and noise studies)
- Vanasse/Hangen Associates, Inc. (transportation studies)
- Drs. D. Ozonoff and J. Groopman of the Boston University School of Public Health (health effects studies)
- The joint venture of Browning-Ferris Industries, Inc., and Air Products and Chemicals, Inc. (information on Facility design and operations).

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LIST OF ACRONYMS, ABBREVIATIONS, AND SYMBOLS

acfm:	Actual cubic feet per minute
APCI/BFI:	A joint venture of Browning-Ferris Industries, Inc., and Air Products and Chemicals, Inc.
BACT:	Best Available Control Technology
Btu/lb:	British thermal unit per pound
BWSC:	Boston Water and Sewer Commission
cfs:	Cubic feet per second
City:	City of Boston
CO:	Carbon monoxide
CO_2:	Carbon dioxide
Commonwealth:	Commonwealth of Massachusetts
dBa:	Decibels
DBA:	Deutsche Babcock Anlagen
DEM:	The Massachusetts Department of Environmental Management
DEQE:	The Massachusetts Department of Environmental Quality Engineering
EIR:	Environmental Impact Report
ENF:	Environmental Notification Form
EPA:	U.S. Environmental Protection Agency
ESP:	Electrostatic precipitator
FAA:	The Federal Aviation Administration
Facility:	The Boston waste-to-energy facility to be designed, constructed, owned, and operated by APCI/BFI.
GEP:	Good engineering practice
gpm:	Gallons per minute

LIST OF ACRONYMS, ABBREVIATIONS, AND SYMBOLS (continued)

gr/dscf:	Grains per dry standard cubic foot
HC:	Hydrocarbons
HCl:	Hydrochloric acid
H_2S:	Hydrogen sulfide
ISC:	EPA Industrial Source Complex Model
kWh:	Kilowatt-hours
LAER:	Lowest Achievable Emission Rate
lbs/hr:	Pounds per hour
LOS:	Level of service
MDC:	Metropolitan District Commission
MEPA:	The Massachusetts Environmental Policy Act
MW:	Megawatt
NAAQS:	National Ambient Air Quality Standards
NESHAPS:	National Emission Standards for Hazardous Air Pollutants
NO_2:	Nitrogen dioxide
NOAEL:	No adverse effect level
NO_x:	Nitrogen oxides
NSPS:	New Source Performance Standards
O_3:	Ozone
OSHA:	Occupational Safety and Health Administration
Pb:	Lead
PILOT:	Payment in lieu of taxes
ppm:	Parts per million

LIST OF ACRONYMS, ABBREVIATIONS, AND SYMBOLS (continued)

PSD:	Prevention of Significant Deterioration
psia:	Pounds per square inch absolute
psig:	Pounds per square inch gauge
RFD:	City of Boston, Request for Developers of a Waste-to-Energy Project
SO_2:	Sulfur dioxide
SO_x:	Sulfur oxides
TPD:	Tons per day
TPY:	Tons per year
TSP:	Total suspended particulates
ug/m^3:	Micrograms per cubic meter

1. INTRODUCTION

The City of Boston (City) is facing a major problem as regards the long-term disposal of its municipal solid waste. Dependence on disposal sites, primarily landfills, that are located outside of the City is becoming increasingly costly and uncertain as available landfill capacity in the region continues to diminish.

To provide a long-term economically and environmentally sound solution to its solid waste disposal problem, the City is undertaking the development of a waste-to-energy facility in Boston. A joint venture of Browning-Ferris Industries, Inc., and Air Products and Chemicals, Inc. (APCI/BFI) has been selected to develop and to design, construct, own, and operate the Boston waste-to-energy facility (Facility), which will combust municipal solid waste via a commercially proven mass-burning technology and recover energy for sale to the Boston Edison Company.* The Facility will be located at the site of the City's closed-down incinerator, which is an industrial/commercial area on South Bay Avenue bordering the Southeast Expressway, approximately 1 mile south of downtown Boston. Figure 1.1 is an artist's rendition of the proposed Facility.

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* Energy market contract negotiations have not yet been completed.

FIGURE 1.1

ARTIST'S RENDITION OF THE FACILITY

Pursuant to the Massachusetts Environmental Policy Act (MEPA), an Environmental Impact Report (EIR) must be prepared that describes the proposed project and its impacts and benefits. The Draft EIR is presented herein and includes:

- A summary description of the project, its benefits, and its environmental impacts and associated mitigation measures.
- A description of the proposed site.
- A description of the proposed Facility design.
- A description of the waste to be processed at the Facility, and the residue (ash) to be disposed of in a sanitary landfill.
- A detailed environmental impact analysis for Facility construction and operation, including mitigation measures to reduce impacts.
- A discussion of the project's resource conservation attributes.

- A discussion of project alternatives.

- A circulation list for the Draft EIR.

Detailed technical analyses of air quality, transportation, noise, and potential health effects of the Facility are included as appendices in Volume II of this EIR. Volume II also includes additional supporting analyses, calculations, and information referenced as appendices throughout this Draft EIR.

The remainder of this Section describes the project background and status and includes copies of the Environmental Notification Form (ENF) and the Certificate of the Secretary of Environmental Affairs on the ENF. This Certificate describes the scope of issues addressed in the Draft EIR.

1.1 PROJECT BACKGROUND

The City generates approximately 500,000 tons per year (TPY) of municipal solid waste from households, businesses, and institutions. Approximately 250,000 TPY are household waste collected and disposed of by private firms through contracts with the City. The remaining tonnage is business and institutional waste that is collected and disposed of privately without City involvement.

The City currently disposes of its household waste at four landfills and at a waste-to-energy facility, all of which are located outside of the City. Some 72 percent of the waste goes to landfills located in Plainville, East Bridgewater, and Amesbury, Massachusetts; and Rochester, New Hampshire. These landfills are located 25 to 80 miles (one-way) from Boston. The remaining 28 percent of the waste is disposed of at an existing waste-to-energy facility in Saugus, Massachusetts [approximately 8 miles (one-way) from Boston].

Information from the Department of Environmental Management (DEM), Bureau of Solid Waste indicates that, by 1987 (when the Boston Facility is expected to be operational), most of the existing landfills in the eastern Massachusetts area will have reached their current permitted capacity.[1] There are currently 12 major commercial landfills permitted by the Commonwealth of Massachusetts that are located in the eastern part of the Commonwealth: Amesbury, Billerica, Peabody, Randolph, Cohasset, Plainville, Attleboro, East Bridgewater, Bridgewater, Halifax, Fall River, and Acushnet. By 1987, six of these landfills will have reached their current permitted capacity; four will have only 1 to 2 years of capacity remaining; and only two (Plainville and Halifax) will have significant capacity remaining.

Thus, by 1987, the City's waste disposal problem will be greatly exacerbated as two of the four landfills on which the City now relies (East Bridgewater and Amesbury) will be filled. Moreover, the Saugus

waste-to-energy facility is currently filled to capacity.

Not only is landfill availability diminishing, but disposal costs are increasing. The City's current costs for disposal of collected household waste [1983-1986 (the City enters into 3-year contracts for disposal services)] range between $20 and $25 per ton of waste[2]. Relative to the 1980-1983 contract period, these disposal costs represent a 36-percent increase.

Cost increases will continue as available landfill capacity diminishes. Disposal costs at landfills will increase as competition for their use increases, and transportation costs will increase significantly because with landfill closures, waste will likely need to be transported to landfills located even further from the City.

By 1987, two new waste-to-energy facilities currently under construction are expected to be operational. One facility is in North Andover, and the other is in Haverhill/Lawrence. Because these two facilities are located approximately 24 miles and 30 miles (one-way), respectively, from Boston, the City would continue to incur significant transportation/transfer costs in the use of these disposal sites. Moreover, both of these facilities are expected to be filled to capacity by waste from communities in their respective service areas.[3]

For the above reasons, the City is developing a waste-to-energy project in Boston as a solution to its waste disposal problem. The decision to develop a local waste-to-energy facility is based on the following:

- It provides the City with a long-term (20+ years) environmentally sound solid waste disposal solution that is within its control.

- It provides the City with greatly improved waste transportation logistics.

- It enables the City to turn its waste from a liability into a commodity through energy recovery.

- It provides the City with economic and financial benefits that it can only obtain as the host community for a waste-to-energy facility, including annual payments in lieu of taxes (PILOT) for the waste processed (pursuant to Massachusetts Statute, Chapter 16, Section 24A), site lease payments, and local job opportunities.

1.2 PROJECT STRUCTURE AND STATUS

On April 25, 1983, the City issued a Request for Developers (RFD) of a Waste-to-Energy Project[4]. The RFD specified the Developer's responsibilities, the City's commitments, and the minimum business arrangement and technical requirements for the City's Service Contract with the selected Developer.

The Developer is responsible for designing, constructing, owning, and operating the waste-to-energy facility, as well as for project development activities. The City is committing to deliver all of its household waste to the facility for 20 years, offering a site for the facility, and overseeing the environmental design and permitting process, including preparation of the EIR. The City required prospective Developers to provide a system that used demonstrated commercial technology [i.e., either a mass-burning technology or a prepared fuel (refuse-derived fuel) technology with a dedicated boiler]. Powdered, densified, and wet prepared fuels were not deemed acceptable technologies as regards commercial demonstration. The City offered the existing South Bay Incinerator site to prospective Developers, but did not limit prospective Developers to that site so long as any alternative site proposed was located within the City. The City required the waste-to-energy facility to be at least sized to be capable of processing the City's household waste, but allowed proposals for facilities sized to process additional waste. In the case of a larger facility, the City required that its household waste

be accepted first. The City required the Developer to provide landfill capacity for residue (ash) and any unprocessed waste over the 20-year term of the Service Contract.

Proposals from five prospective Developers were received by the City on August 10, 1983. Four of the proposers offered mass-burning technology, with facility sizes ranging from 900 tons per day (TPD) to 1,516 TPD, and chose to utilize the South Bay Incinerator site. The fifth proposer offered to develop a transfer station at the South Bay Incinerator site for transfer of the City's household waste by rail to the planned SEMASS waste-to-energy facility in Rochester, Massachusetts [approximately 45 miles (one-way) from Boston].

In October 1983, after a thorough technical, environmental, and business/economic evaluation of the proposals received, the City made a final selection of APCI/BFI as the Developer with whom to negotiate a Service Contract. APCI/BFI will develop a 1,516-TPD waste-to-energy Facility at the existing South Bay Incinerator site. The Facility will cogenerate steam and electricity, with steam to be sold to Boston Edison for use in its District Heating System, and electricity also sold to Boston Edison. Residue (ash) and any unprocessed waste from the Facility will be landfilled at the MacDonald Brothers landfill located in Halifax, Massachusetts. Construction of the Facility is planned to commence in the summer of 1984, and the Facility is expected to start commercial operations in early 1987.

REFERENCES

1. Telephone discussions between CSI Resource Systems, Inc., and Department of Environmental Management, Bureau of Solid Waste, September 1983.

2. Boston Waste Disposal Contracts (1983-1986).

3. (a) "Preliminary Official Statement Dated February 4, 1983, Town of North Andover, Massachusetts; Resource Recovery Revenue Bonds."

   (b) "Official Statement, Massachusetts Industrial Finance Agency, Solid Waste Revenue Bonds, May 6, 1982."

4. "City of Boston Request for Developers of a Waste-to-Energy Project," April 25, 1983.

Boston

June 28, 1983

Secretary
Executive Office of Environmental Affairs
100 Cambridge Street
Boston, Massachusetts 02202

Attn: MEPA Unit

Dear Sir:

Enclosed please find the original and two (2) copies of the Environmental Notification Form for the City of Boston Waste-to-Energy Project. Copies were also forwarded to all participating agencies and other appropriate entities as specified in Appendix B of the MEPA regulations.

A Notice of Intent to Submit Environmental Notification Form, Appendix F, has been or will be published in the Boston Globe.

Please call us if you should have any questions regarding our submittal.

Very Truly Yours,

Joseph F. Casazza

JOSEPH F. CASAZZA
Commissioner of Public Works

JFC/mm
Enclosures

Kevin H. White, Mayor/DEPARTMENT OF PUBLIC WORKS / Boston City Hall/City Hall Plaza 02201
Joseph F. Casazza, Commissioner, 725-4900
Robert P. Mehegan, Executive Secretary 725-4901

APPENDIX A
COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS

ENVIRONMENTAL NOTIFICATION FORM

I. SUMMARY

A. Project Identification

1. Project Name: Boston Waste-to-Energy Project

2. Project Proponent: City of Boston working with a developer
   Address: to be named later

B. Project Description: (City/Town(s)) Municipal Waste-to-Energy Facility, Boston, MA.

1. Location within city/town or street address: Project is located at South Bay Incinerator site at S.Bay Ave. & Massachusetts Ave. Exit of the northbound lane of S.E. Expressway.

2. Est. Commencement Date: 1984 Est. Completion Date: 1987
   Approx. Cost $ 50,000,000 to $150,000,000 Current Status of Project Design: 5 % Complete

C. Narrative Summary of Project

Describe project and give a description of the general project boundaries and the present use of the project area. (If necessary, use back of this page to complete summary).

The Boston Waste-to-Energy Project (Project) will be a privately developed and operated project to incinerate municipal solid wastes from Boston (City), and possibly other communities, to generate steam and/or electricity. Hazardous waste will not be accepted by the Project. The City will supply a yet-to-be-named Developer with about 600 tons per day (TPD) of municipal solid waste, and will provide the incinerator site (Site).

The Developer will design and build a waste-burning power plant (Facility) at the incinerator site, most likely using contiguous land owned by the Commonwealth of Massachusetts and/or by others if necessary (see Exhibit 1 for Site location). The Facility will be designed to have a capacity between approximately 750 and 2,250 TPD, depending on the extent to which the Developer has secured waste supply contracts with additional suppliers. The Developer will employ either a massburning or a prepared-fuel with dedicated boiler technology, but will be precluded from employing a technology involving prepared powdered, densified, or wet fuels.

The Developer will contract for the sale of steam or electric energy, or both, to a large user. The most likely energy customer is Boston Edison, which could purchase steam for its downtown steam loop or electricity for distribution to its customers.

Copies of this may be obtained from:
Name: Joseph F. Casazza, Commissioner Firm/Agency: Public Works Department
Address: City of Boston Phone No. (617) 725-4900

 THIS IS AN IMPORTANT NOTICE. COMMENT PERIOD IS LIMITED.
For Information, call (617) 727-5830

Use This Page to Complete Narrative, if necessary.

The Developer will be responsible for operating and maintaining the Facility for a period of at least 20 years. The Facility will be operated in accordance with all applicable federal, State, and local laws. Residues (fly ash, bottom ash, and nonprocessible wastes) from the Facility will be disposed of off-site at a permitted landfill.

Waste suppliers will deliver wastes in trucks designed for the safe transport of solid wastes. They will approach and leave the Facility, using Massachusetts Avenue, Southampton Street, the Southeast Expressway, or local streets.

The Site is bordered on the east, north, and west by the Southeast Expressway and its Massachusetts Avenue interchange ramps; and on the south by an industrial area, including a meat packing plant to the southeast. The Boston City Hospital is located across the interchange ramps to the southwest. If a steam delivery line is required to serve the Boston Edison steam-loop, it will be installed to connect to existing steam lines at or near Albany Street.

(Continued on p. 2A.)

This project is one which is categorically included and therefore automatically requires preparation of an Environmental Impact Report: YES X NO _____

D. Scoping (Complete Sections II and III first, before completing this section.)

1. Check those areas which would be important to examine in the event that an EIR is required for this project. This information is important so that significant areas of concern can be identified as early as possible, in order to expedite analysis and review.

	Construction Impacts	Long Term Impacts		Construction Impacts	Long Term Impacts
Open Space & Recreation			Mineral Resources		
Historical			Energy Use		X
Archaeological			Water Supply & Use		X
Fisheries & Wildlife			Water Pollution		X
Vegetation, Trees			Air Pollution		X
Other Biological Systems			Noise		X
Inland Wetlands			Traffic		X
Coastal Wetlands or Beaches			Solid Waste		X
Flood Hazard Areas			Aesthetics		
Chemicals, Hazardous Substances, High Risk Operations			Wind and Shadow		
			Growth Impacts		
Geologically Unstable Areas			Community/Housing and the Built Environment		
Agricultural Land					
Other (Specify)					

2. List the alternatives which you would consider to be feasible in the event an EIR is required.

   1. No Project.

   2. Use of Site for other permitted uses in an industrial-zoned area.

C. Narrative Summary of Project (continued)

The Site has been used for solid waste incineration in the past. The Facility will be designed to conform to applicable federal, State, and local environmental requirements. A preliminary air quality modeling study indicates that air quality impacts are minimal and well within standards for facilities with capacities between 750 TPD and 2,250 TPD. Air pollution control equipment will include electrostatic precipitators for particulate removal. Makeup water for the Facility will be provided by the Metropolitan District Commission. Process wastewater from the Facility will be recycled to minimize water needs. Process and sanitary wastewater will be disposed of in the City sewer system. Stormwater runoff from impervious surfaces will be channeled as necessary to drain into the existing sewer system.

Noise during construction and operation will be compatible with the industrial setting in which the Facility is located and will meet state limitation requirements. Facility design requirements for odor control include: all delivery trucks will be covered; Facility waste disposal and storage areas will be totally enclosed; and combustion air will be drawn from the waste disposal and storage areas and incinerated prior to discharge through the stack.

E. Has this project been filed with EOEA before? Yes ______ No __X__
If Yes, EOEA No. __________ EOEA Action? __________

F. Does this project fall under the jurisdiction of NEPA? Yes ______ No __X__
If Yes, which Federal Agency? __________ NEPA Status? __________

G. List the State or Federal agencies from which permits will be sought:

Agency Name	Type of Permit
DEQE	Air - PSD, Incinerator Design and Operation; and Air Pollution Control permits.
DEQE	Wastewater - State Industrial User Sewer Permit.
FAA	Notice of Proposed Construction.

H. Will an Order of Conditions be required under the provisions of the Wetlands Protection Act (Chap. 131, Section 40)?
Yes ______ No __X__ (Facility will not be located within 100 feet of wetlands.)
DEQE File No., if applicable: __________

I. List the agencies from which the proponent will seek financial assistance for this project:

Agency Name	Funding Amount
None -- Project to be privately financed.	

II. PROJECT DESCRIPTION

A. Include an original 8½ x11 inch or larger section of the most recent U.S.G.S. 1:24,000 scale topographic map with the project area location and boundaries clearly shown. Include multiple maps if necessary for large projects. Include other maps, diagrams or aerial photos if the project cannot be clearly shown at U.S.G.S. scale. If available, attach a plan sketch of the proposed project.

B. State total area of project: Approximately 3.4 acres plus potential use of two adjoining parcels of 5.5 acres for a total of 8.9 acres.
Estimate the number of acres (to the nearest 1/10 acre) directly affected that are currently:

1. Developed .... 3.4 to 8.9 acres
2. Open Space/Woodlands/Recreation __0__ acres
3. Wetlands .... __0__ acres
4. Floodplain .... __0__ acres
5. Coastal Area .... __0__ acres
6. Productive Resources
   - Agriculture .... __0__ acres
   - Forestry .... __0__ acres
   - Mineral Products .... __0__ acres

C. Provide the following dimensions, if applicable: See page 3A.
Length in miles ______ Number of Housing Units ______ Number of Stories ______

	Existing	Immediate Increase Due to Project
Number of Parking Spaces	0	30
Vehicle Trips to Project Site (average daily traffic)	0 *	100-200 trucks
Estimated Vehicle Trips past project site. .(Average daily traffic)	141,400 **	100-200 trucks

D. If the proposed project will require any permit for access to local or state highways, please attach a sketch showing the location of the proposed driveway(s) in relation to the highway and to the general development plan; identifying all local and state highways abutting the development site; and indicating the number of lanes, pavement width, median strips and adjacent driveways on each abutting highway; and indicating the distance to the nearest intersection.

* When incinerator was operated in 1960s and 1970s, truck traffic was approximately 100 vehicles per day.

** On Southeast Expressway at Southampton St., both directions. (Source: Mass. DPW.)

C. Facility size is a function of throughput capacity, selection of technology, and plant configuration. Approximate size ranges are as follows:

Plant Capacity	Approximate Plant Area	Approximate Building Height
750 TPD to 2,250 TPD	120,000 to 250,000 sq ft	60 to 140 feet, not including stack

III. ASSESSMENT OF POTENTIAL ADVERSE ENVIRONMENTAL IMPACTS

Instructions: Consider direct and indirect adverse impacts, including those arising from general construction and operations. For every answer explain why significant adverse impact is considered likely or unlikely to result.

Also, state the *source* of information or other basis for the answers supplied. If the source of the information, in part or in full, is not listed in the ENF, the preparing officer will be assumed to be the source of the information. Such environmental information should be acquired at least in part by field inspection.

A. Open Space and Recreation

1. Might the project affect the condition, use or access to any open space and/or recreation area?
Yes ______ No __X__

Explanation and Source:

The Site is in the heart of an industrial area, remote from any open space or recreation area. The nearest park is about 2,000 feet from the Site.

B. Historic Resources

1. Might any site or structure of historic significance be affected by the project? Yes ______ No __X__

Explanation and Source:

Based on a review of maps at the Massachusetts Historical Commission, the Site is not historically significant nor does it contain any structures of historic value.

2. Might any archaeological site be affected by the project? Yes ______ No __X__

Explanation and Source:

The Site and much of the land surrounding it was created by filling in the Fort Point Channel late in the last century. Based on a preliminary conversation with the Massachusetts Historical Commission, it is not expected that the Site contains archaeological resources.

C. Ecological Effects

1. Might the project significantly affect fisheries or wildlife, especially any rare or endangered species?
Yes ______ No __X__

Explanation and Source:

The Site has been industrialized for decades and provides little or no habitat for wildlife.

2. Might the project significantly affect vegetation, especially any rare or endangered species of plant?
   Yes _____ No __X__
   (Estimate approximate number of mature trees to be removed: ___0___)

   Explanation and Source:

   There is little vegetation, no mature trees, and no rare or endangered species of plant on the Site.

3. Might the project alter or affect flood hazard areas, inland or coastal wetlands (e.g., estuaries, marshes, sand dunes and beaches, ponds, streams, rivers, fish runs, or shellfish beds)? Yes _____ No __X__

   Explanation and Source:

   The Site is not within a flood hazard area, as delineated on flood hazard maps prepared by the Federal Emergency Management Administration. Development of the Site will not occur within 100 feet of any wetlands area.

4. Might the project affect shoreline erosion or accretion at the project site, downstream or in nearby coastal areas? Yes _____ No __X__

   Explanation and Source:

   Facility location does not include, nor is it adjacent to, any water bodies. Erosion control measures will be initiated and carried out throughout periods of construction. Stabilization measures, including seeding and mulching, will be carried out to reduce erosion potential after construction.

5. Might the project involve other geologically unstable areas? Yes _____ No _____ ?

   Explanation and Source:

   Logs of borings taken in 1957 for the purpose of constructing the City's incinerator indicate that a layer of fill (approximately 30 feet deep) is underlaid by a thick layer of soft blue clay (about 100 feet) on part of the Site. The boring logs can be made available at Metcalf & Eddy, 50 Staniford Street, Boston.

D. Hazardous Substances

1. Might the project involve the use, transportation, storage, release, or disposal of potentially hazardous substances?
   Yes _____ No __X__

   Explanation and Source:

   The Site will be utilized to construct and operate a waste-to-energy facility for the disposal of municipal solid waste. Hazardous materials will <u>not</u> be accepted.

E. Resource Conservation and Use

1. Might the project affect or eliminate land suitable for agricultural or forestry production?
Yes ______ No __X__
(Describe any present agricultural land use and farm units affected.)

Explanation and Source:

The Site is on industrial land. It has no agricultural or forest potential.

2. Might the project directly affect the potential use or extraction of mineral or energy resources (e.g., oil, coal, sand & gravel, ores)? Yes ______ No __X__

Explanation and Source:

Borings at the Site do not indicate the presence of any valuable resources.

3. Might the operation of the project result in any increased consumption of energy? Yes ______ No __X__

Explanation and Source:
(If applicable, describe plans for conserving energy resources.)

The energy recovered by burning municipal wastes will be utilized to generate steam and/or electricity for sale to Boston Edison Company or other energy buyers. The Facility will make possible the annual savings of approximately 10 to 30 million gallons of oil, depending on Facility size.

F. Water Quality and Quantity

1. Might the project result in significant changes in drainage patterns? Yes ______ No __X__

Explanation and Source:

Grading will be limited to the vicinity of the Facility and will be designed to maintain existing surface flow patterns as much as possible.

2. Might the project result in the introduction of pollutants into any of the following:
(a) Marine Waters .... Yes ______ No __X__
(b) Surface Fresh Water Body .... Yes ______ No __X__
(c) Ground Water .... Yes ______ No __X__

Explain types and quantities of pollutants.

Process wastewater will be recycled to the extent possible, and, along with sanitary wastewater, will be discharged to the City's sanitary sewers. Therefore, no waterborne pollutants will be released to any water body.

3. Will the project generate sanitary sewage? Yes __X__ No ____

If Yes, Quantity: 1000-3000 gallons per day

Disposal by: (a) Onsite septic systems .... Yes ____ No __X__

(b) Public sewerage systems .... Yes __X__ No ____

(c) Other means (describe)____________________

4. Might the project result in an increase in paved or impervious surface over an aquifer recognized as an important present or future source of water supply? Yes ____ No __X__

Explanation and Source:

Although there will be an increase in paved or impervious surface area, the Site area is not recognized as an aquifer serving as a source of water supply. (See Item 5 below.)

5. Is the project in the watershed of any surface water body used as a drinking water supply?
Yes ____ No __X__

Are there any public or private drinking water wells within a 1/2-mile radius of the proposed project?
Yes ____ No __X__

Explanation and Source:

6. Might the operation of the project result in any increased consumption of water? Yes __X__ No ____

Approximate consumption 1,500,000 gallons per day. Likely water source(s) City of Boston water

Explanation and Source:

Expected water use depends on Facility size and design decisions. Water use would be highest with a 2,250-TPD Facility selling steam-only to Boston Edison. This water consumption would, however, replace water currently consumed by Boston Edison to supply an equivalent amount of steam to the steam loop.

7. Does the project involve any dredging? Yes ____ No __X__

If Yes, indicate:

Quantity of material to be dredged____________________

Quality of material to be dredged____________________

Proposed method of dredging____________________

Proposed disposal sites____________________

Proposed season of year for dredging____________________

Explanation and Source:

G. Air Quality

1. Might the project affect the air quality in the project area or the immediately adjacent area?
Yes __X__ No _____

Describe type and source of any pollution emission from the project site. Stack gases emitted into the atmosphere will contain particulate matter not in excess of 0.05 grains per dscf at 12% CO_2. A preliminary air quality modeling study indicates minimal impacts that are well within the State and federal air quality standards designed to protect public health.

It is possible that the Facility will have a wet cooling tower if the Project includes the production of electricity. The cooling tower would be designed so as to minimize the potential for creation of icing and fog conditions.

2. Are there any sensitive receptors (e.g., hospitals, schools, residential areas) which would be affected by any pollution emissions caused by the project, including construction dust? Yes _____ No __X__

Explanation and Source:

There are several receptors of various types in the vicinity of the Site. Exhibit 2 is a plan of the area surrounding the Site, showing the location of receptors identified during a preliminary reconnaissance. Receptor types are identified with a key. Only the closest receptor of each type is shown. A preliminary air quality modeling study indicates minimal impacts that are well within the State and Federal air quality standards designed to protect public health.

3. Will access to the project area be primarily by automobile? Yes _____ No __X__
Describe any special provisions now planned for pedestrian access, carpooling, buses and other mass transit.

Access to the Facility is primarily for refuse trucks.

H. Noise

1. Might the project result in the generation of noise? Yes __X__ No _____

Explanation and Source:
(Include any source of noise during construction or operation, e.g., engine exhaust, pile driving, traffic.)

The Facility will be designed to ensure conformance to City of Boston noise limits. The Site is surrounded on three sides by a major expressway and its on- and off-ramps, so that background noise levels are high during most hours of the day and night.

2. Are there any sensitive receptors (e.g., hospitals, schools, residential areas) which would be affected by any noise caused by the project? Yes _____ No __X__

Explanation and Source:

See description of location of hospitals, schools, and residential areas in G.2 and Exhibit 2. The Facility will be designed to ensure conformance to City of Boston noise limits.

I. Solid Waste

1. Might the project generate solid waste? Yes __X__ No ____

Explanation and Source:
(Estimate types and approximate amounts of waste materials generated, e.g., industrial, domestic, hospital, sewage sludge, construction debris from demolished structures.)

Solid waste generated by the Facility will consist of bottom ash and fly ash. The anticipated ratio of volume reduction of solid waste entering the Facility to ash is 10 to 1.

J. Aesthetics

1. Might the project cause a change in the visual character of the project area or its environs?
Yes ____ No __X__

Explanation and Source:

The Site is presently the location of the City's South Bay Incinerator, a visible landmark, long associated with solid waste processing.

2. Are there any proposed structures which might be considered incompatible with existing adjacent structures in the vicinity in terms of size, physical proportion and scale, or significant differences in land use?
Yes ____ No __X__

Explanation and Source:

The proposed Facility will be recognizable as a solid waste incinerator, but it will be designed more in the style of a modern power plant which will improve the aesthetics of the area.

3. Might the project impair visual access to waterfront or other scenic areas? Yes ____ No __X__

Explanation and Source:

There are no scenic vistas in the vicinity of the Site which would be impaired.

K. Wind and Shadow

1. Might the project cause wind and shadow impacts on adjacent properties? Yes ____ No __X__

Explanation and Source:

IV. CONSISTENCY WITH PRESENT PLANNING

A. Describe any known conflicts or inconsistencies with current federal, state and local land use, transportation, open space, recreation and environmental plans and policies. Consult with local or regional planning authorities where appropriate.

No conflicts or inconsistencies are anticipated.

V. FINDINGS AND CERTIFICATION

A. The notice of intent to file this form has been/will be published in the following newspaper(s):

(Name) The Boston Globe (Date) ______
135 Wm. T. Morrissey Blvd.
Boston, MA 02125

B. This form has been circulated to all agencies and persons as required by Appendix B.

June 30, 1983
Date

Joseph F. Casazza
Signature of Responsible Officer or Project Proponent

Joseph F. Casazza, Commissioner
Name (print or type)

Address Public Works Department, City of Boston
City Hall, Room 714, Boston, MA 017701

Telephone Number (617) 725-4900

June 30, 1983
Date

James J. Binder Peter Carothers
Signature of person preparing ENF (if different from above)

James J. Binder/Peter Carothers
Name (print or type)

Address CSI Resource Systems, Inc.
88 Broad Street, Boston, MA 02110

Telephone Number (617) 542-3070

EXHIBITS

Exhibit 1	USGS Quadrangle Map
Exhibit 2	Street Map with Receptors (Blueline Drawing Exhibit E marked to show receptors)


Charles River
RIVER Basin
Beacon Hill
State House
Frog Pond
Boston Common
City Hall
Faneuil Hall
Customhouse
Post Office
BOSTON
INNER
Fort Point Channel
Commonwealth Pier
Fish Pier
U.S. NAVAL RES
Reserved
Back Bay
Copley Square
Library
Park Sq
INTERCHANGE 21
INTERCHANGE 23
INTERCHANGE 24
INTERCHANGE 22
CONRAIL
NORTHEASTERN UNIVERSITY
Mackey Sch
Rotch Playground
Blackstone Square
Franklin Square
INTERCHANGE 15
City Hospital
Madison Park
Eliot Cem
Orchard Park
SITE
FITZGERALD EXPRESSWAY
South Boston
Telegraph Hill
National Shrine
Hoar Sch
INTERCHANGE 16
Andrew Square
COLUMBIA RD
Radio Tower
L Street Beach
Independence Square
City Point
Dearborn Sch
DUDLEY
SOUTHAMPTON
Playground
High Sch
Fire Sta
Washington Park
BOSTON
Columbus Park
Carson Beach
Old Harbor
INTERCHANGE 17
Columbus Circle
Everett Square
Uphams Corner
Columbia Sq
Tidal Flat
Radio Tower
Dever Sch
Savin Hill Cove
Savin Hill
Savin Hill Park
Pumping Sta
Boston Tech High Sch
Brooks Sch
Fenwick Sch
Everett Sch
Dickerman Sch
King Jr High Sch
Grove Hall
Dorchester Square
Fox Pt
Morley Sch
McConnell Park
St Peters Sch
Burke High Sch
Atherton Sch
Meeting House Hill
Malibu Beach
Gibson Sch
Mt Bowdoin
Ronan Park
Cushing Sch
Commercial Pt
Mud
Cleveland Sch
Marshall Sch
INTERCHANGE 18
Squantum

Exhibit 2 (Street Map with Receptors)
is available for viewing at:

The Department of Public Works
Room 714, City Hall
Boston, Massachusetts.

The Commonwealth of Massachusetts
Executive Office of Environmental Affairs
100 Cambridge Street
Boston, Massachusetts 02202

MICHAEL S. DUKAKIS
GOVERNOR

JAMES S. HOYTE
SECRETARY

CERTIFICATE OF THE SECRETARY OF ENVIRONMENTAL AFFAIRS

ON

ENVIRONMENTAL NOTIFICATION FORM

PROJECT NAME:	Boston Waste-to-Energy Project
PROJECT LOCATION:	Boston
EOEA NUMBER:	4820
PROJECT PROPONENT:	City of Boston
DATE NOTICED IN MONITOR:	July 11, 1983

Pursuant to M.G.L., Chapter 30, Section 62A and Sections 10.04(1) and 10.04(9) of the Regulations Governing the Implementation of the Massachusetts Environmental Policy Act, I hereby determine that the above referenced project does require the preparation of an Environmental Impact Report.

This project involves the construction and operation of an up to 2250 ton per day (Tpd) waste to energy facility designed to convert municipal solid waste to electrical energy or to salable steam.

The project is categorically included for preparation of an EIR pursuant to 301 CMR 10.32,(5),30; Resource Recovery facilities capable of receiving more than 300 Tpd of refuse. The following shall be the Scope for the required EIR.

INTRODUCTION

This section should contain an introduction to the report to include brief descriptions of the location, the facility and processes, a copy of the ENF and this Determination of Scope.

SUMMARY

This summary section should include the objectives and goals of the project, a summary of the major environmental benefits, a construction schedule, a listing of licenses and permits required from State, Federal and local authorities and the advantages of the selected technology over other technologies.

DESCRIPTION OF THE PROPOSED PROJECT

This section should present descriptions of existing and proposed conditions at the project location including access, site layout, topographic features, geology, hydrology and adjacent land use, and should include information, in so far as it is available, on the solid waste supply including sources and types of waste.

The site or sites for disposal of residue and ash and the site or sites to be used as back-up landfill should be identified and the physical characteristics of these sites should be described.

DESCRIPTION OF THE PROPOSED FACILITY

This section should describe in detail the selected process, the operation of the facility, the efficiencies of the system including an energy balance of the entire system, reliability of the process, including examples of operating facilities and any identified problems associated with them, all back-up and stand-by equipment or facilities, and electric transmission facilities needed to connect to the power grid or pipelines to connect to steam grid.

DESCRIPTION OF WASTE AND RESIDUES

Describe the types of wastes to be accepted, the amount of waste to be burned, the amount of residue to be generated, specifically, the amount of fly ash, bottom ash residue and report a mass balance for inputs and outputs. Chemical analyses of ash from similar plants should be presented.

DESCRIPTION OF THE WASTE RECEIVING AND STORAGE AREAS

This section should describe the refuse receiving and storage facilities including capacities, methods of handling bulky or non-combustible materials, methods for controlling hazardous materials in the incoming waste stream, onloading and feed procedures, housekeeping and air venting systems, vector control, fire prevention, litter control and dust and odor control.

ENVIRONMENTAL IMPACT ANALYSIS

i. Archaeological and Historic Sites: It is recommended that this subject be discussed with both the Massachusetts Historical Commission and the State Archaeologist. Their input should be discussed in the EIR.

ii. Water Supply and Wastewater Disposal: The EIR shall define the water supply requirements of the facility by use and shall describe the properties of the wastewater and the means of ultimate disposal.

iii. Air Quality Analysis: Discuss the requirements of the State Implementation Plan (SIP), the Clean Air Act Amendments and the National Emission Standards for Hazardous Air Pollutants as well as those requirements for siting a major point source in a non-attainment area.

Meteorology and climatology of the area should be examined. Also, discuss in detail measured ambient levels of criterion and non-criterion pollutants either at the site or in the region.

iv. Air Impact Analysis: A detailed analysis of impacts of the proposed facilities on the ambient air quality and sensitive receptors; organic compounds and toxic metals emissions evaluation; potential health effects and odor problems from plant emissions as well as emission from mobile sources and the stand-by should be presented in this section. The discussion should focus on:

- Dispersion model selection criteria; model description; advantages and disadvantages of the selected model.

- Discussion of meteorological and emission input data.

- Impacts of predicted emission levels of various pollutants on the ambient air quality. (Annual as well as hourly average periods)

- PSD increment analysis and impact on non-attainment pollutants.

- Discussion of all the available offset credits, including estimate of volatile organic compounds (VOC) emissions. The project proponent should also determine whether or not the facility will have to offset these emissions and apply "lowest achievable emission rate" (LAER) control technology as specified in 310 CMR, Section 7102(2)(b)5 - Regulations for the Control of Air Pollution.

- Evaluation of noncriterion pollutants and hazardous trace elements. The proponent should also determine whether or not lead emissions from the proposed facility will exceed the USEPA's newly promulgated ambient air quality standard.

- Impact on sensitive receptors. (NO_x, Pb, Hg, HC should be considered in the evaluation.)

- Hydrogen chloride (HCL) emission: Although emission of HCL at present is not regulated either by USEPA or by DEQE, the applicant should determine the emission levels of HCL and the resultant impact on the ambient air quality and, potential hazard to public health as well as damage to the vegetation.

- Evaluate the applicable emission control technology.

v. Noise Analysis: Existing ambient noise levels should be established by means acceptable to the Department of Environmental Quality Engineering. A detailed analysis of the impact of the facility operation including refuse handling, processing systems, and ash hoppers on the ambient noise levels and on sensitive receptors should be presented. The analysis should also include noise associated with the truck traffic.

vi. Traffic Impact: The EIR should define the arrival/departure routes for refuse vehicles and should make estimates of existing and proposed traffic volumes to the site.

vii. Aesthetics: This section should identify such things as building massing, heights, orientation, screening, etc. and should assess the visual impact

on adjacent properties and from the SE Expressway.

viii. Measures to Reduce Environmental Damage: This section should describe features of the facility and related aspects of the project in general, designed to reduce environmental damage or enhance environmental benefits. In general:

a. Air Quality: Discuss in detail the air pollution control equipment which will be installed and, the control efficiency and reliability. Also discuss good engineering stack height analysis, the air quality monitoring program, and dust and odor control from plant operation.

b. Noise: Specify measures that will be incorporated in the building design (or equipment housing) to mitigate noise impacts.

c. Traffic: Discuss measures to minimize traffic impacts on the neighboring areas. Alternative truck travel routes should be evaluated.

d. Aesthetics: Features which will enhance plant aesthetics and measures that will be incorporated in the plant design to reduce visual impacts should be discussed.

RESOURCE CONSERVATION

Briefly discuss equipment, built-in features and other practices or measures that will be employed to conserve a) Energy, and b) Water.

In brief, a comparative analysis of feasible options (i.e. build vs. no-build) should be developed. The alternative schemes such as landfilling, alternate scale, mass-burn and RDF technologies should also be considered.

SHORT-TERM CONSTRUCTION IMPACT

Short-term adverse environmental impacts should be analyzed. Construction methods as well as equipment to be utilized should be summarized. In addition, measures to mitigate adverse impacts should be detailed.

Finally, all the available technical analysis, monitoring data, modeling information, survey reports, useful official correspondence, conclusions and claims made in the EIR should be compiled and should be made available with the report. Maps, photos and artist's sketches should also be incorporated when they help depict the environmental setting.

The proponent may wish to modify the above format so as to incorporate existing analyses or materials into the EIR. This may be done, to the extent that the above issues are fully addressed and the EIR is clear and orderly. Should you have any questions concerning these requirements, please let me know. The MEPA staff will be available to advise you during the preparation of the Draft EIR

August 10, 1983
DATE

JAMES S. HOYTE, SECRETARY

2. PROJECT SUMMARY

The City is facing a major problem regarding the long-term disposal of its municipal solid waste. Dependence on outside disposal sites, primarily landfills, has resulted in significant increases in disposal costs in recent years. Increasingly diminishing landfill capacity in eastern Massachusetts threatens to further escalate these costs. To provide a long-term economically and environmentally sound solution to its solid waste disposal problem, the City is undertaking the development of the proposed Boston waste-to-energy Facility.

The remainder of this Section provides a summary description of: the proposed project and its schedule; the major benefits and impacts of the project; and project alternatives. (Sections 3 through 9 of the EIR provide a detailed discussion of the above.) In addition, this Section contains a list of permits and approvals required for this project.

2.1 PROPOSED PROJECT DESCRIPTION AND SCHEDULE

The Facility will be located in Boston and will combust municipal solid waste primarily from Boston to produce energy for sale. The Facility will cogenerate steam and electricity, with steam to be sold to Boston Edison for use in its District Heating System, and electricity to be sold to Boston Edison as well. The Facility will be located at the site of the City's closed-down incinerator; accordingly, this site has been used for solid waste incineration in the past. This site, known as the South Bay Incinerator site, is an industrial/commercial area on South Bay Avenue bordering the Southeast Expressway, approximately 1 mile south of downtown Boston. Construction of the Facility is planned to commence in the summer of 1984, and the Facility is expected to be ready for commercial operations in early 1987.

APCI/BFI will design, construct, own, and operate the Facility. The Facility will consist of two mass-burning furnace/boiler units and one 45-megawatt (MW) turbine-generator. Each of the furnace/boilers will be designed to process 758 TPD of municipal solid waste, giving the Facility a total waste processing capacity of 1,516 TPD at a heating value of 5,250 British thermal units per pound (Btu/lb). The Facility will process waste 24 hours per day, 7 days per week; it will be open to receive waste 12 hours per day (6:00 a.m. to 6:00 p.m.), Monday through Saturday. The Facility will utilize the mass-burning technology developed by Deutsche Babcock Anlagen (DBA) of

West Germany. This technology is currently operating in more than 50 waste-to-energy plants worldwide, including plants in Germany, France, Great Britain, The Netherlands, Sweden, USSR, Hungary, Japan, and Singapore, and has approximately 20 years of operating history.

The Facility will process 453,738 TPY of solid waste, and will generate 113,734 TPY of residue (bottom ash and fly ash) on a wet basis for disposal at the MacDonald Brothers landfill in Halifax, Massachusetts. Oversized, bulky solid waste delivered to the Facility that is not processible will also be landfilled at the MacDonald Brothers landfill. When the furnace/boiler units are out of service for maintenance or repairs, the Facility will serve as a transfer station, and waste received at the Facility that cannot be processed will be loaded on transfer trailers for disposal at the MacDonald Brothers landfill. Hazardous waste will not be accepted by the Facility. If hazardous waste inadvertently reaches the Facility, such items as unopened 55-gallon drums will be separated from the processible waste by the crane operator and disposed of at an approved landfill.

The Facility will be designed to conform to applicable federal, Commonwealth, and City environmental requirements. Air pollution control equipment will include electrostatic precipitators (ESPs) for particulate removal. Makeup water for the Facility will be provided by the Metropolitan District Commission (MDC) and the Boston Water and Sewer Commission (BWSC). Process wastewater from the Facility

will be recycled to minimize water needs. Process and sanitary wastewater will be disposed of in the BWSC combined sewer system on South Bay Avenue. Stormwater runoff from impervious surfaces will be drained to an existing storm sewer system on Southampton Street. All delivery and residue (ash) trucks will be covered, and Facility waste disposal and storage areas will be totally enclosed. Combustion air will be drawn from the waste disposal and storage areas and incinerated prior to discharge through the stack in order to control odors and dust.

2.2 MAJOR BENEFITS AND IMPACTS

The Boston Facility will provide a long-term solution to the City's solid waste disposal problem and bring substantial additional benefits to the City. The Facility will be designed and operated to minimize environmental impacts. Provided below is a summary discussion of the project's benefits, its environmental impacts, and measures being taken to mitigate these impacts.

2.2.1 BENEFITS

The Facility will provide benefits to both the City and the Commonwealth. In summary, the Facility will:

- Provide a long-term reliable and economically attractive solution to the City's solid waste disposal problem:

    - The Service Contract between the City and APCI/BFI will cover at least 20 years and will provide a predictable disposal fee over that period. Under current practice, the City contracts for waste collection and disposal on a 3-year basis, such that long-term security is not provided either in terms of cost or availability of disposal capacity.

    - The net disposal cost to the City when Facility operations commence in 1987 will be competitive with the City's current disposal costs and will increase each year at 1/2 of the increase in a weighted inflation index. On the other hand, the disposal costs to the City under its current 3-year contracts have increased 36 percent from the 1980-1983 contract disposal costs. This

increase is 40 percent higher than the general rate of inflation during 1980 to 1983.

- Because landfill capacity in eastern Massachusetts is diminishing rapidly, competition for available landfill capacity will increase and landfill disposal will be at even more remote locations, thereby exacerbating cost increases. Thus, with the Facility, the City will benefit from a controlled cost increase, rather than continuing to subject itself to landfill disposal cost increases of significant and unknown magnitude.

- Provide payment to the City (PILOTs) for each ton of waste processed at the Facility (pursuant to Massachusetts Statute, Chapter 16, Section 24A). Under this Statute, the PILOT escalates each year at 100 percent of the increase in the general rate of inflation.

- Provide payment to the City for use of the South Bay Incinerator site (site lease payments). The site lease payment escalates each year at 100 percent of the increase in the general rate of inflation.

- Make productive use of a site currently not used by the City, except for storage. This, in turn, should enhance the use of currently vacant neighboring land.

- Provide for approximately 375 jobs during the peak of construction and some 44 permanent positions during Facility operations.

- Extend the use of existing landfills in the eastern Massachusetts area, by reducing the volume of the waste processed at the Facility by approximately 90 percent. This will, in turn, reduce the need for expanding existing landfills and/or siting new landfills, and, thereby, conserve land for more productive use.

- Reduce truck mileage for waste to be disposed of at the Facility by approximately 1,400,000 miles per year as compared to the current disposal practice. This will result in: reduced wear and tear on highways; an energy savings of 280,000 gallons per year of diesel fuel; and reductions in emissions of particulate, sulfur oxides (SO_x), carbon monoxide (CO), hydrocarbons (HC), nitrogen oxides (NO_x), aldehydes, and organic acid air pollutants by 1.9, 4.3, 43.7, 7.0, 31.9, 0.5, and 0.5 tons per year respectively. The reduction in air pollutant emissions will

contribute to migitating the region's nonattainment problem for ozone and CO air quality standards.

- Displace the use of 28,500,000 gallons of oil or 4,300 million cubic feet of natural gas per year currently used by Boston Edison to supply steam to the District Heating System and electricity to its customers. This will reduce dependence on fossil fuels and could reduce air emissions from and utilization of the Boston Edison plants serving the District Heating System.

2.2.2 IMPACTS AND MITIGATION MEASURES

The Facility will be designed and operated to meet all applicable federal, Commonwealth, and City regulations and standards. The Facility is not expected to significantly impact the environment. Specific environmental impacts from the Facility and measures taken to mitigate these impacts are summarized below.

2.2.2.1 Impacts and Mitigation During Operations

Operational impacts assessed included:

- Historic and archeological impacts

- Water use and water quality impacts
- Air quality impacts, including health effects
- Traffic impacts
- Noise impacts
- Cooling tower impacts
- Aesthetics.

2.2.2.1.1 Historic and Archeological Impacts. The Massachusetts Historical Commission has reviewed the proposed project and determined that the project will not affect significant cultural, historical, or archeological resources.

2.2.2.1.2 Water Use and Water Quality Impacts. Water will be supplied to the Facility from the MDC and the BWSC water system. Wastewater and stormwater runoff will be discharged to the BWSC sewer system.

Water use and wastewater and stormwater discharges are not expected to significantly impact the MDC/BWSC water supply system, the BWSC sewer system, or the site. Water use and wastewater and stormwater discharges are within capacity limits deemed acceptable by BWSC.

The Facility is designed to cogenerate steam and electricity. When operating at full capacity, the Facility will utilize between 198.5 gallons per minute (gpm) and 1,016 gpm of water depending on the relative amounts of steam and electricity generated. The maximum water use would occur during maximum steam export to the Boston Edison District Heating System in the winter months.

The water demands are not totally "new" water demands, because the water needed for providing steam to the District Heating System (the Facility's greatest water demand) and electricity to Boston Edison will displace a similar amount of water currently used by Boston Edison to provide steam to the system and electricity to its customers. "New" water demands for the Facility should not exceed 62 gpm (54 gpm of process wastewater plus 8 gpm of sanitary wastewater).

Process wastewater will be recycled in the Facility to the extent possible to minimize water use. In addition, the Facility will include a wet/dry cooling tower, which will reduce water use during those times when it is operated either in the combined wet-dry mode or in the dry mode.

Wastewater from the Facility will be discharged to the BWSC sewer system on South Bay Avenue in accordance with MDC, BWSC, and Commonwealth discharge requirements. Process wastewater (28.5 to 54 gpm) will be treated via blending and neutralization prior to its discharge to the sewer. To reduce the amount of wastewater

discharged, process wastewater will be recycled to the extent possible to supply the water needs of the ash quenching operation. Sanitary wastewater (8 gpm), from sinks, showers, and toilets, will be discharged directly to the sewer system.

Stormwater runoff will be collected on site and discharged to the BWSC storm sewer system on Southampton Street. Site development will result in an increase in the amount of impervious surface area at the site. Consequently, peak discharge for a 25-year storm is expected to increase from 18 cubic feet per second (cfs) to 23 cfs when the Facility is complete, a level safely accommodated by the BWSC storm sewer.

2.2.2.1.3 Air Quality Impacts. A detailed air quality impact analysis for the Facility and associated vehicular traffic was conducted in accordance with Department of Environmental Quality Engineering (DEQE) accepted procedures and suggestions. An analysis of the potential health effects resulting from the predicted air quality impacts was also conducted.

As a result of these analyses, the highest of the air quality impacts from the Facility were found to be minimal and within air quality standards established by the U.S. Environmental Protection Agency (EPA) and the Commonwealth of Massachusetts to protect public health and welfare. Moreover, for those pollutants where standards have not yet been established (noncriteria pollutants), Facility impacts were

also found to be minimal and will not result in acute or chronic (noncarcinogenic) health effects or in an unacceptable risk as established by the Carcinogen Assessment Group of EPA. Finally, there will be no impairment of visibility or damage to vegetation as a result of stack emissions.

Air quality impacts from the Facility are summarized in Table 2.1 and compared to federal and Commonwealth air quality standards.

Numerous measures are being taken in the design and operation of the Facility to minimize air quality impacts, including the proper choice of stack height; the use of efficient air pollution control equipment; proper design of the combustion process; enclosure of waste delivery, waste storage, and residue storage areas; and covering of trucks.

A 270-foot stack height ensures adequate pollutant dispersion and is in keeping with Federal Aviation Administration (FAA) requirements for air safety. High-efficiency ESPs will limit particulate emissions to no greater than .05 grains per dry standard cubic foot (gr/dscf) at 12-percent carbon dioxide (CO_2). Limiting particulate emissions to these levels will also reduce the emissions of heavy metals and trace organic compounds.

Design of the combustion process to operate at temperatures between 1400^{0}F and 1900^{0}F with combustion gas retention of 4 to 8 seconds

TABLE 2.1

PROJECTED AIR QUALITY VERSUS AMBIENT STANDARDS

POLLUTANT	AVERAGING PERIOD	CONCENTRATIONS (ug/m^3)			
		Ambient Standard	Background	Facility Impact[a]	Total Projected Air Quality
SO_2	3-hour	1,300[b]	259	16.6	275.6
	24-hour	365	167.3[c]	5.7	173.0[d]
	Annual	80	42	0.8	42.8
TSP	24-hour	260 (150[b])	133	4.3	137.3
	Annual	75	74	0.4	74.4
CO	1-hour	40,000	13,551	226[e]	13,777
	8-hour	10,000	9,524	157[e]	9,681
NO_2	Annual	100	93	1.1	94.1
Pb	Quarterly	1.5	1.08	0.017	1.1

a. Values shown are highest of the second-highest 3-hour and 24-hour concentrations calculated in each of the 5 years modeled, and the highest of the annual concentrations.

b. Secondary standard.

c. Includes model-calculated contribution from background SO_2 sources (see Table 6.8).

d. Represents the highest combination of background concentration and Facility impact.

e. Is the combined impact of CO emissions from Facility stack and Facility-generated traffic.

will ensure efficient thermal destruction of trace organic materials, as will the thorough mixing and complete combustion of the waste materials, which is ensured by the design of the DBA roller grate system. Normal operating temperature is 1800^{0}F; at this temperature, the combustion gas residence time is 1 to 2 seconds. The efficient combustion design and operation will also reduce emissions of NO_x, HC, and CO to as low a level as possible. Sulfur dioxide (SO_2) emissions are minimal because municipal solid waste is a low-sulfur fuel, typically 0.1-percent sulfur by weight.

To ensure that odors and fugitive dust will not result from the operation of the Facility, the waste discharge and storage area and the residue (ash) storage area will be totally enclosed. Air necessary for the combustion process will be drawn from the waste storage area and incinerated to destroy any potential odors. As a consequence, a slightly negative pressure will be maintained in the waste storage area, which will preclude air from flowing from the storage area to the outside environment. In addition, all incoming waste delivery trucks and outgoing residue trucks will be covered to minimize odor and dust. Residue leaving the Facility will be moist and not apt to be a source of dust.

2.2.2.1.4 Traffic Impacts. An analysis of existing and expected traffic levels was conducted. An assessment was made of potential

changes in waste delivery routes and the effect of increased traffic from the Facility on major intersections near the site, including:

- Massachusetts Avenue at Albany Street

- Massachusetts Avenue/Southampton Street at Melnea Cass Boulevard/Southeast Expressway ramps

- Southampton Street at Topeka Street/Glynn Way

- Southampton Street at Southeast Expressway ramps.

As a result of this analysis, it was determined that the Facility traffic [approximately 72 peak-hour vehicles and 273 vehicles daily (employees, waste delivery trucks, and residue trucks)] can efficiently and safely be accommodated by the area roadway network without adversely affecting acceptable peak-hour traffic operations. Left turns from Topeka Street to Southampton Street will be prohibited because the existing traffic island makes this an awkward maneuver, particularly for trucks.

The site is readily accessed off the Southeast Expressway without requiring travel through residential areas. During Facility operation, approximately 60 percent of the trucks will use the Southeast Expressway to access the site. The remaining 40 percent of the trucks will access the site via high-volume arteries from the

west and southwest. New use of local roadways is expected from waste collection vehicles delivering waste to the Facility from West Roxbury, Jamaica Plain, Brighton, and Roxbury. In all cases, the arteries and roads currently carry substantial volumes of trucks.

There are no changes expected in waste collection practices.

The closing of South Bay Avenue east and west of the Facility will not have any significant impact on access to local businesses because other roads also serve these locations.

It was also determined that the Facility will reduce the number of truck miles now travelled to dispose of the waste that will be processed at the Facility by approximately 1,400,000 miles annually.

2.2.2.1.5 Noise Impacts. To evaluate the potential noise impacts from the Facility and its associated vehicular traffic, a survey of existing noise levels and an assessment of potential impacts on sensitive areas (such as the nearest residences and hospitals), were completed.

From the survey, it was found that the existing noise levels at the closest sensitive receptor areas (University-City Hospital complex, South End residential, and South Boston residential) are relatively high, even for high-density urban areas. Measured residual (lowest) noise levels ranged from 62 decibels (dBA) [daytime, weekday] to 44

dBA (early Sunday morning). The major source of noise in these areas is traffic on the Southeast Expressway and local streets.

The assessment of the noise impacts from the Facility and its associated vehicular traffic indicated that City and Commonwealth noise standards will not be exceeded, and that the Facility activities will produce little to no increase in community noise levels. Because of the masking effect of high-volume traffic on roadways that physically separate the Facility site from the closest noise-sensitive receptors, noise mitigation measures, and attenuation with distance, noise resulting from the Facility is not expected to be audible to most people.

As discussed in Subsection 2.2.2.1.4, most of the trucks will access the site using the Southeast Expressway, with the remainder accessing the site via high-volume arteries from the west and southwest. The additional trucks on these arteries will not result in perceptible noise level increases.

Numerous mitigation measures to reduce noise emissions at the Facility will be taken and will include the installation of silencers and noise barriers. Noise associated with vehicular traffic will be primarily limited to the hours of waste delivery (6:00 a.m. to 6:00 p.m.), thereby minimizing the potential for annoyance during normally quiet periods at night and on Sundays.

2.2.2.1.6 Cooling Tower Impacts. A cooling tower is required in the process to condense steam from the turbine-generator for reuse as boiler feedwater during the production of electricity. The Facility will utilize a wet/dry cooling tower, which can be operated in a wet, a dry, or a combined wet-dry mode. When operating in a wet mode, a condensed water plume and small water droplets (drift) are emitted from the tower with the potential for fogging and icing of nearby roadways. When operating in a dry mode, there is no condensed water plume or drift because the tower operates in a closed cycle (much like a refrigerator), thereby eliminating the potential for fogging and icing. When operating in a combined wet-dry mode, a condensed water plume and drift are emitted, but at reduced levels as compared to the wet mode, thereby reducing the potential for fogging and icing.

An analysis was conducted to determine the impact of operating the tower in the wet mode. It was determined that drift from the cooling tower operating in the wet mode will not be significant enough to cause icing on nearby roadway surfaces. Only rarely will the visible plume from the cooling tower operating in a wet mode be expected to cause a potential for icing or reduced visibility on nearby roadways. When local climatic conditions raise the potential for icing or fogging, the cooling tower will be operated either in a dry mode or in a combined wet-dry mode, thereby eliminating these potential impacts on nearby roadways. No interference with local aircraft traffic is anticipated from the cooling tower plume because of the small size of the plume and because only rarely will visible plumes

extend to elevations exceeding 700 feet above the ground.

2.1.2.1.7 Aesthetics. The architectural design of the Facility will be contemporary, embodying current design for industrial buildings. The Facility will be recognizable as a solid waste incinerator; however, its modern architecture will represent an aesthetic improvement over the existing incinerator facility. Landscaping of the site will include trees, shrubs, and other vegetation, providing an aesthetic improvement over the current condition of the grounds.

2.2.2.2 Impacts and Mitigation During Construction

Short-term environmental impacts will occur during construction of the Facility. Thirty months will be required from initial site preparation, demolition of the existing incinerator structure, to completion of construction activities. After this period, the Facility will undergo testing prior to commercial operations. Major earth-moving activity, including demolition, site preparation, earthwork, and foundation work will be completed in 16 months.

Potential impacts and mitigation measures were assessed for fugitive dust, soil erosion, construction traffic, and construction noise.

2.2.2.2.1 Fugitive Dust Impacts. Fugitive dust will result from demolition, site preparation, and major earth work. Dust will be controlled in the construction area by application of water. In addition, construction vehicles transporting materials will be covered during transport in accordance with City and Commonwealth requirements.

Prior to demolition, an inspection will be made for asbestos materials that may have been used in the construction of the existing incinerator. If asbestos is encountered, demolition will be completed in accordance with DEQE and Occupational Safety and Health Administration (OSHA) requirements. Typical measures include the use of respiratory equipment and special protective clothing, wetting down the work area to minimize airborne asbestos fibres, and disposing of asbestos materials in sealed, impermeable bags or containers at an approved landfill.

2.2.2.2.2 Soil Erosion. Because the site is essentially level, no appreciable soil erosion is expected. Standard erosion mitigation measures will be adopted consistent with City and Commonwealth construction codes. Mulching and seeding of exposed areas will be completed as soon as is practicable.

2.2.2.2.3 Traffic Impacts. During construction, vehicular traffic will increase at the site area as a result of construction workers commuting to the site, material deliveries, and the disposal of

demolition and construction debris. Major access to the site will be by the Southeast Expressway.

Increased traffic during Facility construction is not expected to significantly effect traffic operations. Peak truck traffic levels during Facility construction will be less than the peak truck traffic level during Facility operations, which, as discussed in Subsection 2.2.2.1.4, can efficiently and safely be accommodated by the area roadway network. Construction vehicles will predominately use the Southeast Expressway to access the site, thereby minimizing traffic impacts on local roadways.

2.2.2.2.4 Noise Impacts. Noise impacts will result from construction activity at the site and from vehicular (car and truck) traffic associated with the construction activity.

Construction activity at the site will be limited to the normal daily hours of commerce, approximately 7:00 a.m. to 6:00 p.m. Except for pile-driving activity, construction-related noise is not likely to be noticeable because of the existing high daytime noise levels in the area. The impacts predicted for construction noise from the site (57 to 62 dBA) are similar in magnitude to existing daytime noise levels at sensitive receptor areas (nearest residences and the University-City Hospital complex). In addition, construction noise impacts at the nearest residential and University-City Hospital areas are well below the City construction noise standard of 75 dBA.

Noise associated with construction-related traffic will likely be unnoticeable as a result of the existing high noise levels from Southeast Expressway traffic. Construction vehicles will predominately utilize the Southeast Expressway to access the site, thereby minimizing noise impacts on local roads.

2.3 PROJECT ALTERNATIVES

Alternatives to building the proposed Facility for disposing of the City's solid waste are:

1. Not building the Facility and continuing the current practice of contracting with private firms for the collection and disposal of the City's waste, with dependence on disposal sites (primarily landfills) located outside of Boston.

2. Not building the Facility and arranging for disposal of the City's waste at new waste-to-energy facilities (i.e., those currently in the planning or construction stages) located outside of Boston.

3. Not building the Facility and developing a landfill located in Boston.

4. Developing and building an alternative waste-to-energy facility

located in Boston (i.e., a facility at a site other than the South Bay Incinerator site, employing a technology other than mass-burning, and/or sized at other than 1,516 TPD).

2.3.1 CONTINUING CURRENT PRACTICE OF DISPOSAL AT OUTSIDE LANDFILLS

The City's current collection and disposal practice has a very uncertain and costly future because it involves primary reliance on landfills that are located at a distance from the City and are diminishing in capacity. Even if enough landfill capacity continues to be available for disposal of the City's waste, this alternative is unattractive from the standpoint of economic, environmental, and resource conservation considerations. That is, the City will continue to be subjected to significant disposal and transportation cost increases; the City will continue to rely on a disposal method having the potential to contaminate groundwater and drinking supplies; the City will continue to rely on long-distance waste transportation with the associated fuel use and air pollutant emissions; and the City will continue to rely on landfills with the associated nonproductive use of valuable land resources. Consequently, the City has rejected this alternative in favor of development of the proposed Facility, which represents an economically and environmentally sound means of solid waste disposal, with a certain future and with resource conservation benefits.

2.3.2 ARRANGING FOR DISPOSAL AT WASTE-TO-ENERGY FACILITIES LOCATED OUTSIDE OF BOSTON

Two new waste-to-energy facilities in North Andover and Haverhill/Lawrence are currently under construction and are expected to be operational by 1987. However, neither facility provides a sound solution to the City's waste disposal problem because of the significant transportation/transfer costs that would be incurred and because the waste generated within the two facilities' respective service areas will consume the disposal capacity provided by these facilities.

In addition to the two facilities under construction, several waste-to-energy facilities to be located in eastern Massachusetts are in the planning stages -- the SEMASS project in Rochester and the 128 West project in Plainville. In response to its RFD, the City has received a proposal to participate in the SEMASS project, whereby its waste would be transferred by rail from a proposed transfer station at the South Bay Incinerator site in Boston. This proposal did not meet the City's criterion for local disposal capacity as stated in the RFD. Moreover, evaluation of the proposal indicated that there were major technical risks with the complex transportation network that was proposed, and, consequently, uncertain reliability of this waste disposal service. The 128 West project does not provide a sound solution to the City's pressing waste disposal problem because of the significant transportation/transfer costs that would be

incurred; the uncertainty of when and if this facility will be built; and the consumption of the facility capacity by waste from communities within the facility's service area.

Moreover, with continued use of outside disposal sites, including waste-to-energy facilities, the City will lose the opportunity to obtain certain important economic, financial, and transportation benefits that it can only obtain through local disposal capacity.

For the above reasons, the City has rejected this alternative in favor of development of the proposed Facility, which represents an economically and environmentally sound means of waste disposal, with a certain future and with unique benefits to the City.

2.3.3 DEVELOPING A LANDFILL LOCATED IN BOSTON

For reasons of environmental and resource conservation considerations, the City does not wish to pursue development of a landfill in Boston. Moreover, siting a landfill in Boston will be near to impossible because of inadequate land availability and public concern, such that this alternative does not provide a certain solution to the City's pressing problem. Consequently, the City has rejected this alternative in favor of development of the proposed Facility, which represents an environmentally sound means of solid waste disposal, with a certain future and with economic and resource

conservation benefits that cannot be obtained from a landfill.

2.3.4 DEVELOPING AND BUILDING AN ALTERNATIVE WASTE-TO-ENERGY FACILITY LOCATED IN BOSTON

In response to its RFD, the City received five proposals: four were for waste-to-energy facilities to be located in Boston; the fifth proposal (which was discussed in Subsection 2.3.2) was for a transfer station to be located at the South Bay Incinerator site with rail transfer of the City's waste to the planned SEMASS facility in Rochester. While the City allowed proposals for a waste-to-energy facility employing either a mass-burning or prepared fuel/dedicated boiler technology (commercially demonstrated technologies), it did not receive any proposals for a system in Boston employing this latter technology. The four proposals for a waste-to-energy facility in Boston employed mass-burning technology, used the South Bay Incinerator site, and involved different facility sizes.

After a thorough technical, environmental, and economic evaluation of the proposals received, the City selected the APCI/BFI proposal for a 1,516-TPD mass-burning facility (the proposed Facility) located at the South Bay Incinerator site. The evaluation showed that the 1,516-TPD Facility will be in environmental compliance and that there are no significant differences in air quality or other environmental impacts with smaller facility sizes. Moreover, the proposed Facility

offers the City maximum flexibility regarding capacity, as well as the most attractive economic benefits. Finally, as regards siting, there are inherent advantages to use of the South Bay Incinerator site (e.g., industrial/commercial area, good access for trucks, no change in land use, proximity to energy market).

2.4 REQUIRED PERMITS AND APPROVALS

In addition to meeting the MEPA requirements to prepare an EIR, the following major permits and approvals are required for the proposed project:

PERMIT/APPROVAL	ISSUING AGENCY
AIR PERMIT	
State Air Permit [includes federal Prevention of Significant Deterioration (PSD) requirements]	DEQE, Air Quality Division
WATER PERMITS	
1. MDC/BWSC Industrial User Sewer Permit	MDC and BWSC
2. Sewer Extension or Connection Permit	DEQE, Division of Water Pollution Control
LAND USE	
Assignment of Land for Use for Waste-to-Energy Facility	City of Boston Department of Health and Hospitals
NOISE PERMIT	
City Noise Permit	City of Boston Air Pollution Control Commission

3. PROJECT SITE

This Section describes the Facility site (known as the South Bay Incinerator site) in terms of location, topography, geology, hydrology, land use, layout of the Facility, access, and existing utilities.

3.1 LOCATION

The Facility will be located on a 7.7-acre site in Boston that comprises the City-owned South Bay Incinerator site, an adjacent Commonwealth-owned property, and South Bay Avenue. The site location is depicted on a regional scale in Figure 3.1, and on a local scale in Figure 3.2. The site is bounded by South Bay Avenue on the south; an on-ramp to I-93 (Southeast Expressway) on the north; the Southeast Expressway on the east; and privately owned land on the west that is currently used for warehousing, offices, and a bakery. The City-owned, and now-closed South Bay Incinerator is located on the site.

FIGURE 3.1

SITE LOCATION -- REGIONAL SCALE

FIGURE 3.2

SITE LOCATION -- LOCAL SCALE

3.2 TOPOGRAPHY

The site area is essentially level, with surface elevations varying between about 10 and 20 feet above mean sea level. The site and surroundings are currently either paved or built on, with little vegetation present and no mature trees. The existing incinerator building, its three stacks, and the two storage tanks will be razed and the debris will be removed from the site prior to constructing the Facility.

Once the existing structures are removed, only modest changes in site terrain contours will be necessary to construct the Facility and to ensure effective stormwater drainage. Site topography will be enhanced by the addition of both decorative and functional vegetation during site landscaping.

3.3 GEOLOGY

Subsoil information consists largely of data from borings taken in 1956 for the City's existing incinerator.[1] The site is covered by a layer of miscellaneous fill material approximately 30 feet thick, consisting of sand, silt, and silty peat. The miscellaneous fill is underlain by layers of soft blue clay and yellow stiff clay to a depth of 165 to 185 feet below the surface, and by shale bedrock underneath the clay.

The existing fill soils cannot support heavy column and equipment loads without excessive settlement occurring. Consequently, concrete-filled pipe piles, driven into the bedrock shale, will be utilized to support the column loads in all major Facility structures, as well as the heavy equipment loads. The lightweight Facility structures will be supported on 50- to 60-foot-long precast piles driven into the clay. Truck-receiving ramps servicing the Facility will be supported on granular fill embankments. The organic silt will be stabilized by the installation of wick drains.

3.4 HYDROLOGY

Currently, about 4.2 acres of the 7.7-acre site are covered by impervious surfaces, including structures, access roads, and parking areas. The remaining portions of the site are open space, with a compacted fill surface. Site drainage is poor at present, and appears to be generally directed northward.

Groundwater is 4 to 6 feet below the surface.[2] The standard topographical map for South Boston (photorevised in 1979) indicates that there are no surface water bodies on or near the site. The nearest water bodies are Fort Point Channel and Carson Beach, located about 0.6 miles and 1 mile, respectively, from the site. The site area is not recognized as an aquifer serving as a source of water supply, nor is the site in a watershed of any surface water body used

as a drinking water supply. There are no public or private drinking water wells within a 0.5-mile radius of the site. The site is not within a flood hazard area, as delineated on flood hazard maps prepared by the Federal Emergency Management Administration.

When the Facility is complete, about 80 percent of the site will be covered with impervious surfaces. Little change is expected from existing amounts of stormwater runoff. Peak discharge for a 25-year storm is expected to increase from 18 cfs to 23 cfs. Stormwater will be discharged to the BWSC storm sewer on Southampton Street.

3.5 LAND USE

The City-owned South Bay Incinerator, which has been closed since 1975, is located on the site. The incinerator is a visible landmark, and the site has been associated with solid waste processing since 1959, when the incinerator began operations.

The site is located in an area of industrial and concentrated non-retail commercial activities, and is zoned I-2 Industrial. Activity in the site area includes trucking companies; meat and other food processors; and warehouse operations. This zone of heavy activity, plus the Southeast Expressway and its associated ramps, physically separate the site from the nearest residences and other sensitive areas. The nearest residential areas are 0.25 miles

northwest (South End) and 0.5 miles southeast (South Boston) of the site. The University-City Hospital complex is located about 0.25 miles west of the site.

The City of Boston Department of Health and Hospitals must formally assign land use at the site for a waste-to-energy facility. The Facility will not substantially alter land use from the existing situation. While the Facility will be recognizable as a solid waste incinerator, its modern architecture will represent an aesthetic improvement over the existing incinerator facility.

3.6 SITE LAYOUT

The site layout is depicted in Figure 3.3, with south and east elevation views presented in Figures 3.4 and 3.5, respectively. As indicated in Figure 3.3, the Facility will consist of one main structure and several smaller structures. The main structure will house six distinct buildings, including the tipping hall and refuse bunker; the boiler building; the administration building; the residue (ash) handling building; the turbine building; and the water treatment building. There will be four other smaller structures -- a guardhouse and a scale house near the Facility entrance; a scale house at the Facility exit; and a cooling tower located at the west end of the site.

FIGURE 3.3

SITE LAYOUT

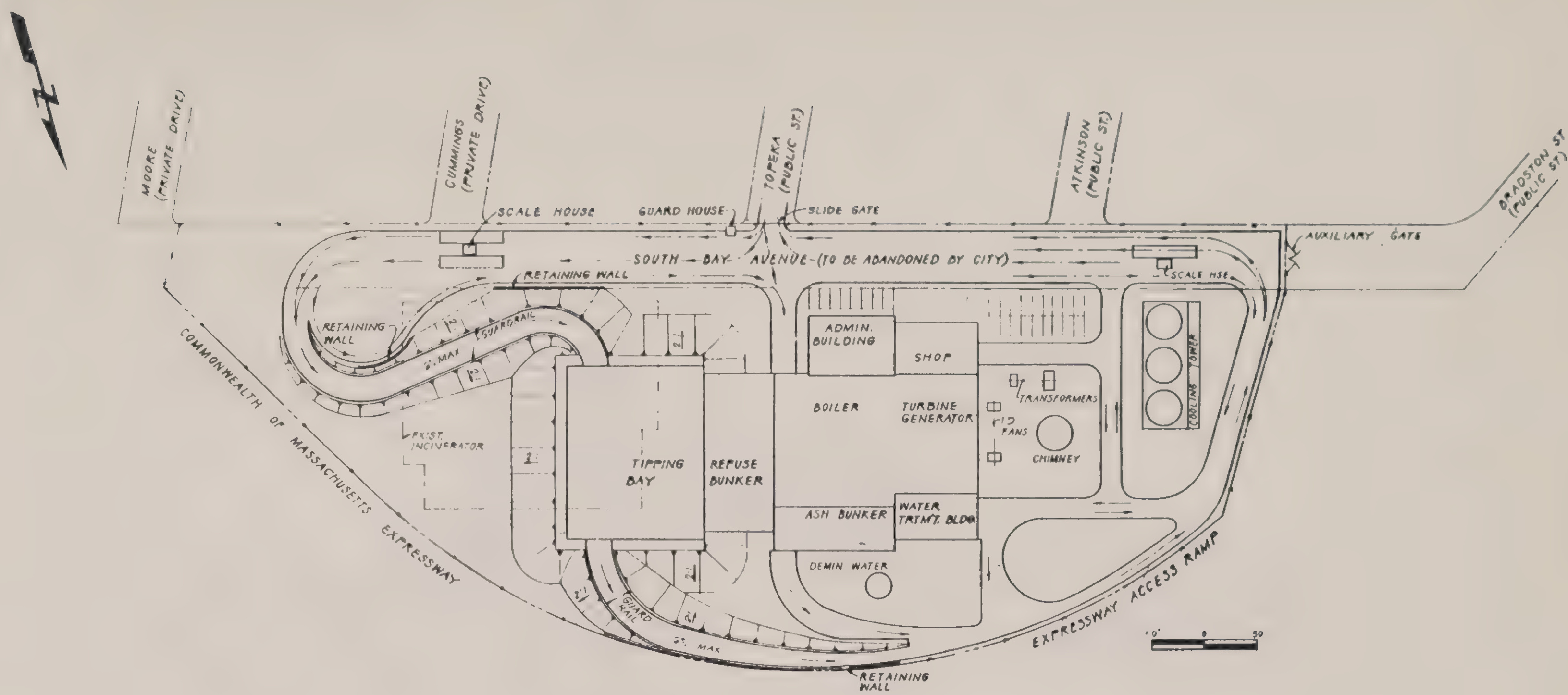
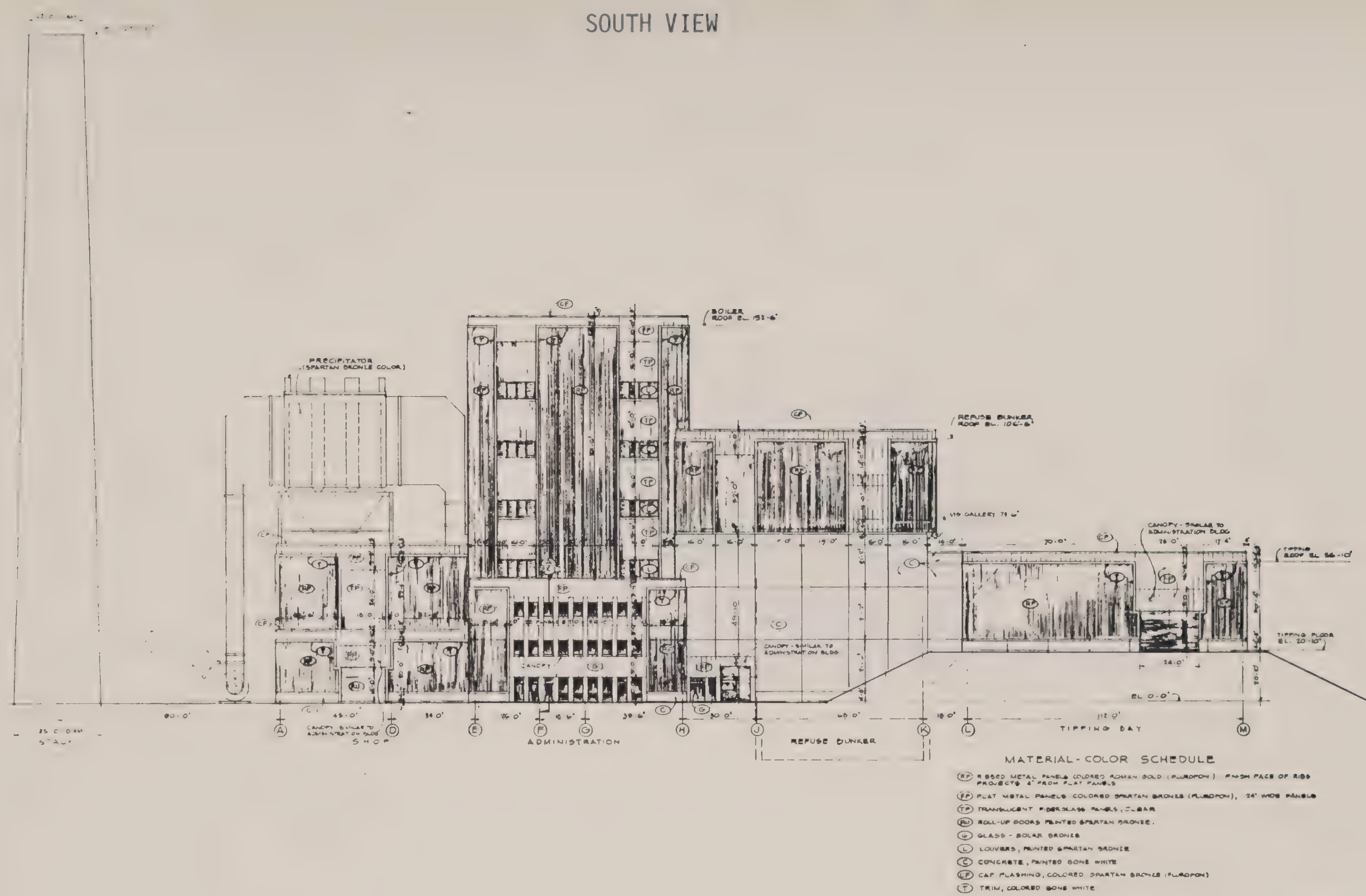


FIGURE 3.4

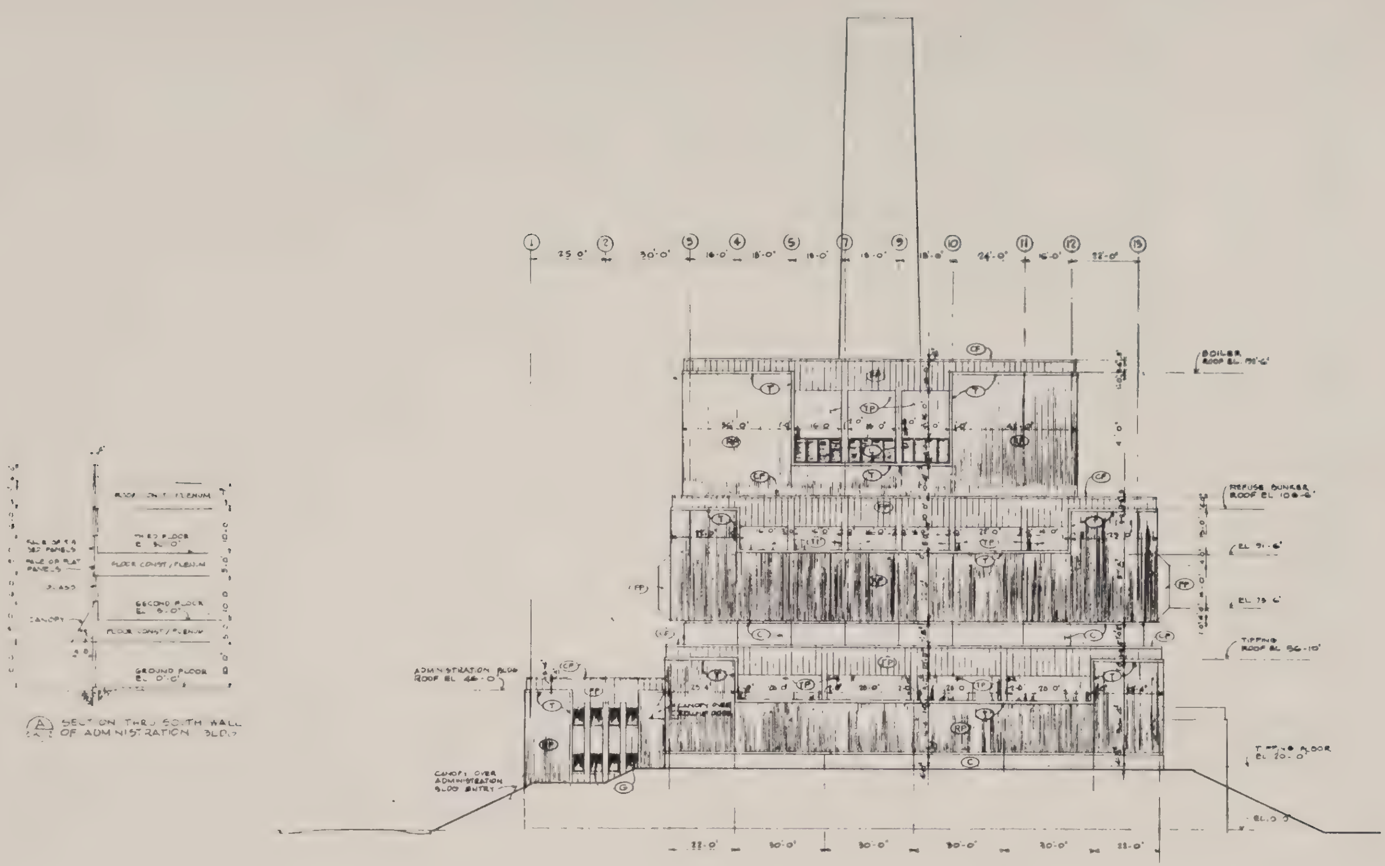
SOUTH VIEW



SOUTH ELEVATION

FIGURE 3.5

EAST VIEW



EAST ELEVATION

3.7 ACCESS

Waste delivery trucks will access the site from Topeka Street. Residue trucks will exit the site also on Topeka Street (see Subsection 6.5 of this EIR for a detailed description of truck transportation and access to the Facility).

3.8 EXISTING UTILITIES

Electricity service exists at the site. A 12-inch combined City sewer line and a 12-inch water main are located on South Bay Avenue. A 4-foot storm drain exists on Southampton Street.

REFERENCES

1. "Report of the City of Boston, Massachusetts Public Works Department Upon the Pile Load Test for the South Bay Incinerator," Metcalf and Eddy Engineers, December 1956.

2. Boring Data from Greater Boston, Boston Society of Civil Engineers, 1961.

4. FACILITY DESIGN

The Facility will consist of: a waste receiving, handling, and storage area, two mass-burning furnace/boiler units and auxiliaries; one 45-MW turbine-generator and auxiliaries; an air pollution control system; a steam transmission line; and an electrical interconnection line. Figure 4.1 is a schematic showing a typical BFI waste-to-energy plant. Each of the boilers will be designed to process up to 758 TPD of municipal solid waste, giving the Facility a total waste processing capacity of 1,516 TPD. The processed waste will have an average heat content of 5,250 Btu/lb. The Facility will process waste 24 hours per day, 7 days per week, and it will be open to receive waste 12 hours per day (6:00 a.m. to 6:00 p.m.), Monday through Saturday. The Facility will convert the energy content of municipal solid waste primarily from Boston into steam and electricity for sale to Boston Edison. The life of the Facility will be at least 20 years. The Facility will utilize the mass-burning technology developed by DBA of West Germany. This technology is currently operating in more than 50 waste-to-energy plants worldwide, including plants in Germany, France, Great Britain, Sweden, The Netherlands, Hungary, USSR, Japan, and Singapore, and has approximately 20 years of operating history.

FIGURE 4.1
SCHEMATIC OF TYPICAL BFI
WASTE-TO-ENERGY PLANT

Collection trucks enter the site at a computer-controlled weigh station and are directed to an enclosed tipping hall (**1**). Waste from collection vehicles is unloaded directly into the refuse bunker (**2**). The overhead refuse crane (**3**) removes waste from the bunker and drops it into the waste charging hopper (**4**). The hopper holds a ready supply of waste for charging the grate system.

The ram feeder (**5**) pushes the solid waste onto the uppermost roller of the roller grate (**6**). The constant turning motion of the set six rollers tumbles and distributes waste evenly along a 30 degree wnward slope to promote thor- gh combustion. The rotational speed of the rollers, the quantity of air provided, and the speed of the ram feeder can all be varied to maintain optimum furnace temperatures.

After combustion of the solid waste on the roller grates, the ash falls off the sixth roller into the water-filled ash trough (**7**). A conveyor carries the ash to the storage bunker. An overhead crane is used to remove the ash and place it in trucks positioned in the enclosed truck aisle.

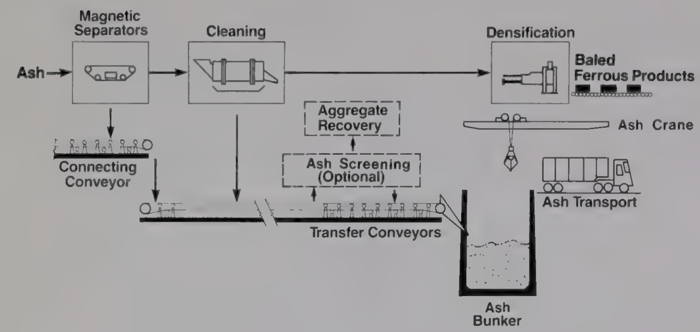
The heat generated by burning the waste produces steam in the waterwall boiler (**8**). Approximately 10% of the energy produced by the turbine generator (**9**) is used to operate the plant.

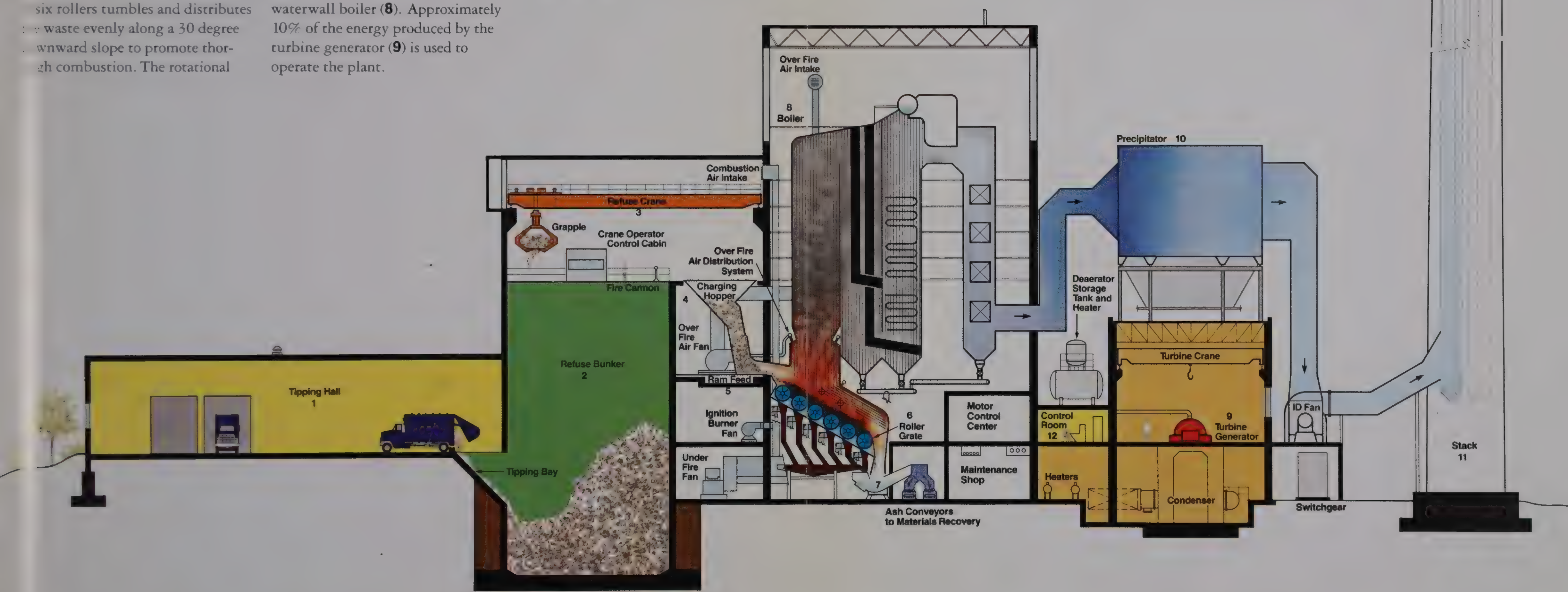
Combustion gases are cleaned of dust particles by an electrostatic precipitator (**10**) or, if required, by a scrubber or baghouse to control air emissions. The cleaned gases are dispersed to the atmosphere through the stack (**11**).

The control room (**12**) houses the central monitoring and control network for the facility.

Equipment can be also added to process the ash and recover, clean, and bale ferrous metals, and produce aggregate for paving and construction materials.

Material Recovery & Ash Handling System





The remainder of this Section describes the Facility design, operations, availability, and architectural treatment.

4.1 PROCESS DESCRIPTION

4.1.1 WASTE PROCESSING

4.1.1.1 Waste Delivery and Handling

Truck traffic will enter the Facility grounds through an entry gate and proceed to the weigh scales to be weighed for record/billing purposes. Here, the driver will be asked to identify the load so that its suitability for discharging can be determined. The trucks will then proceed to the tipping hall, which will be enclosed, and will back up to the tipping bays to discharge their loads into the refuse bunker. After unloading, the trucks will leave the tipping area and proceed to the Facility exit.

The refuse bunker will have a storage capacity of 6,000 tons of municipal solid waste (which will be equivalent to 4 days of storage). The refuse bunker will be totally enclosed and will contain two full-span, overhead travelling cranes. Each crane will be operated from a remote air-conditioned pulpit, containing

dual-control capability and will be able to satisfy 100 percent of the fuel (municipal solid waste) requirements for both furnaces. The overhead crane will mix the solid waste in the refuse bunker to make it more uniform for firing and then will transfer it to the feed hopper. Large objects and materials unsuitable for burning will be removed through hatches at both ends of the charging floor and will be disposed at the MacDonald Brothers landfill in Halifax.

4.1.1.2 Furnace Feeding

After mixing and transferring to the feed hopper, the solid waste will slide by gravity from the feed hopper into the refuse chute, where the waste will serve as an airlock to impede the entry of air into the grate enclosure through the feeding system. A ram feeder will push solid waste from the bottom of the refuse chute onto a roller grate system, which will handle the waste during combustion in the furnace.

4.1.1.3 Waste Combustion

Each furnace/boiler unit will contain the Duesseldorf Roller Grate, which consists of six rotating rollers, extending the full width of the furnace. The rotational speed of each roller can be varied from about 0.6 to 12 revolutions per hour. The surfaces of the rollers

consist of interlocking cast iron grate bars. Spaces between the bars allow combustion air to penetrate the waste bed and provide freedom for movement of the bars as they expand and contract with changes in temperature. The bar movement helps dislodge materials that might accumulate in the spaces between the bars.

The solid waste will be dried by heat from the hot combustion gases by the time it moves across the second of the six rollers. As the dried solid waste crosses the second roller it will ignite. Burnout of the solid waste will be completed by the time the waste passes over the sixth roller, and the residue resulting from the combustion process (bottom ash) will fall off into the residue extractor trough below as it passes over this last roller.

An important feature of the Duesseldorf Roller Grate is the way in which the solid waste is made to tumble, mix, and remix as it travels across the grate, thereby assuring thorough burnout of the waste. As each roller rotates forward, it slowly moves the waste onto the stationary transition piece between it and the next roller. The waste on the transition piece is pushed onto the next roller by the continuous forward movement of the waste on the rollers behind it. As the waste moves forward across the transition piece, it tumbles (rolling and spiraling laterally), thereby being remixed and exposing to the fire solid waste coming down the grate that may not have yet been exposed.

Another important feature of the Duesseldorf Roller Grate is the ability to independently adjust the rate at which solid waste passes across succeeding rollers in the grate, which contributes greatly to the excellent burnout and steady fire characteristics of this technology. Each roller is set to turn more slowly than the previous one. As solid waste burns out on the rollers and its volume decreases, an adequate bed depth of solid material on the surface of the rollers is maintained by adjusting their relative rotational speeds. In this manner, the grate is protected from the intense heat in the grate enclosure, and a deep enough bed of combustible material is provided to ensure good contact with the primary combustion air, and, hence, good burnout.

The primary combustion air flowing through the rollers comes from a separate duct for each roller, thereby allowing individual control of the volume of air to each roller. The air coming up through the rollers helps to cool the grate bars, prolonging their service life and allowing them to be made of relatively inexpensive cast iron. Typically, the grate bars in the Duesseldorf system achieve a service life of more than 20,000 operating hours.

The rate at which the solid waste will be fed to the grate will vary depending on such factors as the demand for steam, the heating value of the solid waste being fed, and its moisture content. The feed rate is altered by changing the cycle time, the stroke length of the ram feeder, or both. When a change in the feed rate is made,

appropriate relative adjustments are also made to the ram feeder cycle time and stroke length, roller speeds, and primary air distribution to particular rollers in order to ensure burnout of the solid waste. To ensure that all combustible components of the combustion gas leaving the grate enclosure are burned, secondary combustion air will be fed into the boiler passage directly above the first two rollers.

To control localized air pollution, the primary combustion air will be drawn from the refuse bunker and the secondary air will be drawn from the boiler house. In this manner, these areas will be continuously purged of malodorous and dusty air, and the odor will be destroyed by combustion. Because air will be drawn out of the refuse bunker area and the boiler house continuously, these locations will be maintained at a slightly lower pressure than outdoors. This pressure differential will assure that malodorous, dust-laden air will not leak from the Facility to the surrounding neighborhood.

Temperature control in the space above the roller grate is another important aspect of the Duesseldorf technology in terms of both air pollution control and steam production efficiency. Unless the temperature of the combustion gas is at least 1400^{0}F as it leaves the grate enclosure, odors and smoke may exit the stack with the flue gas, possibly creating air pollution problems in the vicinity of the Facility. On the other hand, if the temperature of the combustion gas is too high (in excess of 1900^{0}F), NO_x will form to create

another air pollution problem. In addition, at excessively high temperatures, fly ash will become sticky and will more readily adhere to and build up on heat transfer surfaces in the boiler, interfering with steam production efficiency. To maintain combustion gas temperature at between 1400^{0}F and 1900^{0}F as the gas leaves the grate enclosure, waterwalls protected with plastic refractory will be installed on the sides and roof of the grate enclosure in order to absorb some of the heat released by the burning solid waste. The normal temperature of the combustion gas while in the combustion chamber will be approximately 1800^{0}F. The total residence time of the gas in the combustion chamber (from the furnace to the top of the first boiler pass) will range from 4 to 8 seconds.

4.1.1.4 Steam Generation

The hot combustion gas will leave the grate enclosure and flow up through the radiation shaft, where the gas will be cooled to about 1400^{0}F. The cooled gas will then flow successively downward through the platen-type superheater shaft and upward through a boiler shaft containing the final superheater and the evaporator section. The flue gas will continue downward through the economizer section where boiler feedwater is heated, and the flue gas will be further cooled to about 450^{0}F as it leaves the economizer. The steam produced in the boiler will be delivered to a common distribution header, which will supply the turbine-generator and plant auxiliary equipment.

4.1.1.5 Cooling Tower

Spent or unused steam will be condensed, and the heat extracted from the steam will be rejected to the atmosphere through an induced mechanical-draft cooling tower. The cooling tower will be a three-cell wet/dry tower designed for visible-plume abatement. The tower is engineered to cool the circulating water through a range of 25^oF when operating at an approach of 15^oF to the summer design wet bulb temperature of 72^oF. The tower is designed to produce no significant visible plume, even when operating in the wet mode during winter at temperatures as low as -5^oF. A drift eliminator limits drift loss during wet mode operation to only 0.004 percent of the water circulated. During dry mode operation, drift loss is totally eliminated, thus preventing ice from forming on adjacent roadways.

4.1.1.6 Boiler Feedwater

The boiler feedwater system will consist of steam condensed after exhausting the turbine and raw water makeup. The makeup water will be fully treated by carbon filtration and demineralization and then pumped to a storage tank. This tank will supply the makeup water necessary to the boilers via the condenser hotwell.

The demineralization system will consist of two full-capacity trains, with each train made up of a cation exchange unit followed by an anion exchange unit. One train will be in service; the second train will be maintained in a fully regenerated, standby condition. The effluent from this system will contain less than 1 part per million (ppm) total dissolved solids, and less than 0.1 ppm silicon dioxide, thereby permitting the steam generation system to operate with less than 0.5-percent blowdown. The anion exchange units will be charged with acrylic-type resin as a further safeguard against possible resin fouling from dissolved organic material.

4.1.1.7 Process Wastewater

Process wastewater, including boiler blowdown water and demineralizer regenerant wastewater from the makeup water treatment equipment, will be retained in a steel tank for blending. The tank will have a 63,000-gallon capacity, and a maximum input surge capability of 900 gpm. The pH of the mixed wastewater in the tank will be adjusted to an acceptable level by addition of either acid or caustic. Following retention and pH monitoring, the treated wastewater will be discharged at a rate ranging from between 28.5 gpm and 54 gpm to the ash quenching trough and to the BWSC sewer, as necessary.

4.1.1.8 Residue (Ash) Handling and Air Pollution Control

A substantial amount of entrained particulate material (fly ash) carried by the combustion gas leaving the grate enclosure will be removed in the boiler. The boiler will be equipped with hoppers and valves for removing the accumulated fly ash while the boiler is in operation. Material from the hoppers will be transferred by screw conveyors to the residue extractor trough.

Fly ash remaining in the flue gas as it leaves the boiler will be removed in an ESP. The Facility will be designed to operate in compliance with all federal, Commonwealth, and City air pollution regulations. Each of the two combustion trains in the Facility will be equipped with a separate, independently operated, three-field ESP, an induced draft fan, and an in-stack flue. Each ESP will have a design volume flow rate of 221,100 actual cubic feet per minute (acfm), a gas velocity of 3.4 feet per second, and an operating temperature range of $432^{o}F$ to $522^{o}F$. Particulate emissions will be reduced to .05 gr/dscf, corrected to 12-percent CO_2, which represents 99.09-percent efficiency in removing particulate mass from the gas stream. The fly ash will be collected in hoppers at the bottom of each ESP and will be conveyed to the ash quench tank and combined with the bottom ash.

After passing through the ESP, the flue gas will flow through the induced draft fan. The flue gas will then be drawn up the stack for

venting to the atmosphere. The stack will contain two 8-foot-diameter flues; be 270 feet tall; and be made of concrete. The stack will be provided with sampling ports and platforms, as well as lightning protection. The stack will also be marked and fitted with aircraft warning lights as prescribed by the FAA.

The residue extractor trough will be filled with process wastewater, which will cool the bottom ash and fly ash. The water will also serve as an air seal in the bottom of the grate enclosure to prevent air from leaking into the grate enclosure. The ash will be removed from the ash trough by a hydraulically activated, ram-type pusher submerged below the trough's water level.

After quenching, the ash will be pushed upwards through an inclined chute, allowing free water to drain back into the ash trough. At the open end of the chute, the ash will be discharged through a bifurcated chute to one of two 100-percent capacity vibrating conveyors.

The ash will then be conveyed to a storage bunker. The bunker will be equipped with a clamshell bucket to distribute the ash, and with an overhead crane to load the ash into residue trucks for removal to the disposal site. The level capacity of the ash bunker will be about 1,700 cubic yards, or about 4 days of storage capacity.

The residue ash is typically sterile, biologically inert, and about 5 to 10 percent of the volume of the solid waste from which it was produced. Moisture remaining in the residue will inhibit dust blowing during handling at the Facility and during transport to its final disposal site. A sump at one end of the bunker will collect the drained water and return it to the ash quench tank.

4.1.2 ENERGY PRODUCTION AND EXPORT

As a cogeneration plant, the Facility will be designed to produce marketable energy in the form of both steam and electricity. Steam will be sold to Boston Edison's District Heating System, and electricity to Boston Edison. When operating in the all-electric mode, it is estimated that the Facility will provide 230,000,000 kilowatt-hours (kWh) of electricity per year for sale to Boston Edison. In the cogeneration mode, the Facility will provide an estimated 1.8 billion pounds of steam per year to the District Heating System and 120,000,000 kWh of electricity per year for sale to Boston Edison.

4.1.2.1 Turbine-Generator

The turbine-generator system will be driven by an extraction-condensing turbine that will provide steam and electricity for plant

processes and for export to Boston Edison. Steam for export will be provided at a maximum rate of 312,000 pounds per hour (lbs/hr), a pressure of 200 pounds per square inch gauge (psig), and a temperature of 390^{0}F. The electrical generator will be rated at 45 MW nominal power output; 13,800 V; 3 phase; 60 hz; and 0.90 power factor. If no steam were being extracted for sale, 39.5 MW of electricity would be available for sale. As the amount of steam being extracted increases, the amount of electricity decreases. When the maximum amount of steam for sale is being extracted from the turbine (312,000 lbs/hr), about 12.6 MW of electricity will be available for sale to Boston Edison.

4.1.2.2 Export Steam Transmission Line

A new 12-inch underground steam line will be provided to transport Facility-generated steam a distance of approximately 1,850 feet to Boston City Hospital property, the point of tie-in to the Boston Edison District Heating System. The new line will follow the route of an existing steam line from the Facility site to the Hospital property. The existing steam line route runs northwesterly on South Bay Avenue to the intersection with Bradston Street (approximately 600 feet). At this point, it turns right to a northerly direction, undercrossing Bradston Street and both ramps of the John F. Fitzgerald Expressway (approximately 350 feet). It then turns left to a westerly direction, running along the north bank of the Roxbury Canal (approximately 800 feet), where it makes a final right turn to

a northerly direction and extends into the City of Boston Hospital property for approximately 100 feet. Metering equipment approved by Boston Edison Company will be located on the Facility site.

4.1.2.3 Electrical Interconnection

Electric power, generated by the Facility at 13.8 kV, will be transmitted to a main step-up transformer. The transformer will convert the electric power to 115 kV. Adjacent to the transformer, a 115-kV outdoor SF6 circuit breaker will be provided to separate the generator from Boston Edison's system. From the circuit breaker, power will be transmitted underground on a 115-kV oil-filled, pipe-type cable. The cable will be run approximately 4,000 feet to Boston Edison's proposed expanded 115-kV substation at Andrews Square. The route of the transmission line will be south from the Facility site to Southampton Street, then east on Southampton to the proposed expansion of the Andrews Square substation. The cable will be buried, except where it may be required to cross the Southeast Expressway and Massachusetts Bay Transportation Authority property on road overpasses.

4.1.3 UTILITY CONNECTIONS

Auxiliary electrical power required to operate the Facility will

normally be self-supplied by tapping into the Facility generator bus bar. In addition, Boston Edison currently provides electrical power to the site, and this source will serve as the backup power source for the Facility.

A 12-inch water main currently serves the site. BWSC water will be utilized for boiler feedwater and cooling tower makeup, as well as for drinking, kitchens, washrooms, and showers. The demand for BWSC water will range between about 198.5 and 1,016 gpm, depending on the fraction of steam that is extracted for export.

There is currently a 12-inch BWSC sewer line on South Bay Avenue that serves as a combined storm-sanitary sewer. Sanitary wastewater (from washrooms, kitchens, slop sinks, and certain floor drains) will be discharged to the BWSC sewer at an average rate of 8 gpm. Process wastewater (including cooling tower blowdown, equipment washwater, and carbon-filter backwash) will be blended and treated prior to discharge to the BWSC sewer. After blending and treatment, process wastewater will be recycled for use in the ash quench tank as required. Excess process wastewater will be discharged to the BWSC sewer at a rate varying between 28.5 and 54 gpm.

Stormwater runoff from the site will be collected in area drains, and discharged to the existing BWSC storm sewer on Southampton Street.

4.2 PROCESS CONTROL

The Facility will have one centrally located control room where coordination of the waste receiving and charging activities will take place, as well as control of the steam generating system for both of the boilers and control of the export of steam and electrical power. The control room location will allow easy access to all parts of the Facility and will have large glass viewing areas overlooking the boiler fronts. Certain subsystems will be controlled from panels at the locations of the associated equipment; however, supervisory controls and equipment status information will be provided in the central control room.

4.3 MASS AND ENERGY BALANCES

At full operating capacity, the Facility will process 1,516 TPD (126,333 lbs/hr) of solid waste having a heating value of 5,250 Btu/lb. At this capacity, 402,000 lbs/hr of steam will be generated at 870 pounds per square inch absolute (psia) and 842^{0}F, representing a steam production rate of 3.18 pounds of steam for each pound of waste processed. The Facility will generate 26,845 lbs/hr of ash residue (on a dry basis) from the combustion process. Figures P-1 and P-2, presented in Appendix A of Volume II of this EIR, are simplified schematics of the system showing the mass balance of process inputs and outputs.

Figures 3P-1 and 3P-2 provided in Appendix B of Volume II, are process heat balances for both the maximum and zero steam export conditions. The thermal cycle selected for the Facility employs a turbine-generator (throttle conditions are 850 psia and 840^{0}F), condensers, a low-pressure heater, and two 100-percent capacity deaerators. The turbine will have one automatically controlled extraction port for export steam, and one uncontrolled extraction port for feedwater heating, deaeration, and turbine feedwater pump drives. Heat removed from the turbine exhaust steam in the turbine condenser will be rejected to the atmosphere via the wet/dry cooling tower. In the event of turbine outages, steam will be sent directly from the header to a dump condenser for re-introduction into the cycle as feedwater, with a portion of the steam conditioned for export and for feedwater heating via a pressure-reducing, desuperheating station. The dump condenser is sized to condense all of the steam produced.

4.4 OPERATIONS

4.4.1 STAFFING

The Facility staff will consist of administrative, operations, and plant engineering management, including plant foremen, plant operators, maintenance electricians and mechanics, crane operators,

utility workers, and clerical personnel. Overall, a total of 44 persons will be employed at the Facility. This staff will be responsible for the normal operations and maintenance functions associated with the Facility. Administrative personnel will be at the Facility during the day shift, 5 days per week, and will be on call at all other times. The management team will consist of a plant manager and a maintenance manager. The plant manager will have overall responsibility for the Facility, including both operations and maintenance. The maintenance manager will be responsible for all maintenance and repairs needed at the Facility.

Four operating crews will be scheduled to provide 24-hour-per-day, 7-day-per-week coverage on a rotating basis. The maintenance group will be on call at all times, but will normally be on duty during a day shift, 5 days per week. In staffing the Facility, affirmative action/equal opportunity requirements will be observed.

4.4.2 OPERATING PLAN AND RECORDKEEPING

Solid waste will be processed 24 hours per day, 7 days per week to generate steam and electricity for export. As a byproduct of the process, plant ash residues will be generated continuously.

Compatible with the needs of the City, the Facility will be open to receive waste 12 hours per day, Monday through Saturday (6:00 a.m. to

6:00 p.m.). The scale house will be staffed during receiving hours and will include data-recording equipment to log the identity of each delivery vehicle, the time and date of delivery, and the payload of the truck. Daily records of waste deliveries and service will be maintained at the Facility accounting office.

Steam generation rates for each boiler will be automatically recorded and totaled by control room instrumentation. Throttle flow and the flow of steam in the export header will be similarly recorded. Gross and net export electricity rates will be recorded by in-plant metering equipment. To measure Facility performance against the waste-firing rate, each refuse crane will be provided with weighing systems to measure and record the grapple payloads fed to individual furnaces. On a daily basis, the inputs and outputs of the plant will be totaled in the operating performance records maintained in the Facility general offices. In addition to the waste- and energy-related flows, residue (ash) weights will be recorded when residue is removed from the Facility.

4.4.3 MAINTENANCE

Maintenance activities at the Facility will fall into three categories: preventive maintenance programs, major overhauls, and unscheduled repairs.

Preventive maintenance will be performed by Facility maintenance personnel according to a month-by-month schedule administered and monitored by the APCI/BFI home office operations and maintenance staff. The number of hours of operation will be the major criterion for determining when to perform most maintenance procedures. However, to ensure boiler efficiency, boiler cleaning will be performed whenever the boiler exit gas temperature approaches 550^{o}F.

Major overhauls will be scheduled at 4-year intervals. The outages that are associated with the overhaul operations will be from 4 to 6 weeks in duration per furnace/boiler unit.

Unscheduled repairs will be undertaken when key components suffer an unexpected failure. Such repairs are likely to be caused by bearing failures. Repairs of this type will be made by Facility maintenance personnel utilizing the spares inventory for critical parts. Unscheduled outages will range in duration from a few hours to several days.

The Facility refuse bunker will provide storage for 6,000 tons of municipal solid waste (i.e., 4 days of storage capacity). To provide an optimum level of Facility productivity, waste inventories will normally be maintained at a high stock level. In anticipation of scheduled outages, the backlog will be dropped to minimum levels just prior to shutting down a unit. The 4-day storage capacity will minimize the amount of waste that has to be bypassed during

short-term outages for scheduled maintenance and unscheduled repairs.

Whenever one of the two operating units is shut down for maintenance, repair, or major overhaul, the remaining unit can process all the household waste from the City. During these times, deliveries of non-City waste will be diverted, if necessary, to the backup disposal site.

In the very unlikely event of simultaneous, extended outages of both operating units, it will be necessary to divert waste deliveries to the backup disposal site. In this unlikely event, some waste deliveries will be directly diverted to the backup disposal site, and the Facility will serve as a transfer station for the remaining waste deliveries. After delivery to the Facility, the refuse cranes will remove the waste through hatches and load it into trucks, which will haul the waste to the backup disposal site.

4.4.4 VISITORS

The Facility will include a visitors' gallery, and adequate visitor parking will be provided.

4.4.5 SAFETY AND HEALTH

During design, construction, and operation of the Facility, OSHA standards and Commonwealth and City requirements will be adhered to strictly. Only equipment meeting OSHA and other applicable safety requirements will be purchased. Safety devices will include a quick-closing shut-off gate on the refuse feed chutes, shields on dynamic equipment, instant shut-off devices, electrical interlocks, color-coded piping and valves, wheel locks on vehicles, and safety and warning signs.

An employee safety orientation and training program will be implemented prior to Facility startup and will continue throughout the term of operations. This program will include the following areas of employee safety:

- Personal safety equipment - use of hardhats, safety shoes, goggles, and hearing protection devices.

- First aid - location and use of first aid supplies; procedures to follow in case of medical emergencies.

- Housekeeping practices - schedules, procedures, and philosophies.

Foremen and crane operators will be trained to identify any hazardous materials (e.g., unopened 55-gallon drums) in the waste for removal. Although such materials are not processible waste, they can be mixed in with the refuse and find their way into the pit.

All employees will be trained in fire prevention and control. In the event of small pit fires, such fires will be controlled by immediately charging the flaming or smoldering material into a combustion unit, or dousing with the water cannons that will be located at the ends of the bunker. Fire hose connections will be strategically located on the tipping floor level for quenching "hot loads" as well as for extinguishing any pit fires. They will also be placed in other appropriate locations to assure 100-percent coverage of the Facility. A water header running the length of the pit will be used to douse the whole pit in the event of a large-scale pit fire. Water sprinkler systems will cover the administration building, garage, precipitator area, and lube oil reservoir. Halon systems will protect the main control room and precipitator control room. Dry-type fire extinguishers will be located throughout the Facility in accordance with applicable regulations. In addition, training sessions will be held with local firefighting departments to familiarize them with the Facility.

The Facility will be secured from unauthorized access by a permanent fence completely surrounding the Facility site. The entrance gate

for employees and visitors will be open during normal office hours. At other times the gate will be locked.

The Facility is designed and will be operated to eliminate bacteria and vectors (disease-carrying insects and rodents), which otherwise could pose a health problem or nuisance to the community. Waste in the storage bunker will be constantly turned over and mixed by the overhead cranes as a routine step in Facility operations. The continuous mixing, coupled with the rapid rate of waste throughput, eliminates the possibility of the waste becoming a breeding place for rodents and insects. The intense heat between $1400^{o}F$ and $1900^{o}F$ and long residence time (between 4 and 8 seconds) of the combustion gas in the combustion chamber (furnace through the first boiler pass) assures the complete thermal destruction of bacteria.

4.4.6 TRAFFIC CONTROL

The proximity of the proposed site to the Southeast Expressway makes this a favorable location. Topeka Street will serve as the main access road to the site, with Bradston Street as an alternative or auxiliary route.

Once waste delivery vehicles enter the plant from Topeka Street, they will turn right into either of two lanes leading to the scales. A vacant lane leading to the scale house will divide the two truck

lanes. After exiting the scales, the loaded trucks will merge before taking the ramp up to the tipping bay. The grade of this ramp will not exceed 6 percent and will be safely maintained in inclement weather by operating personnel. There will be 10 tipping bays with adequate maneuvering space.

After discharging their loads, the trucks will exit the tipping bay by descending the ramp and then merge with loaded ash trucks. Trucks delivering City waste will be weighed again after discharging their loads. These trucks will be weighed on a scale located on South Bay Avenue in the second lane from the right before exiting the Facility. The right lane will be used by local plant traffic and empty trucks other than City trucks that have been tared. All trucks will exit the site using Topeka Street.

Residue trucks will enter the site as above, but will continue straight ahead to the residue bunker unless they have not been tared. In this case, they will follow the loaded waste trucks through the scales, make a 180^{0} turn using the cul-de-sac provided for this purpose and return to the residue bunker entrance using the northernmost lane of the four-lane street. Upon leaving the residue bunker, they will proceed as described above.

The traffic control plan provides for staging of: 8 waste delivery trucks between the entrance gate and the scales; 2 trucks on the scales; and 13 trucks between the scales and the tipping bay door.

Thus, a total of 23 waste delivery trucks can be accommodated between the gate and the tipping bay door.

Assuming a liberal allowance of 8 minutes average to discharge a waste delivery truck at the tipping bay, each tipping bay can service about eight trucks an hour. Therefore, with 10 tipping bays, the Facility can handle up to 80 refuse trucks per hour without significant delays. Studies indicate that waste deliveries will probably concentrate twice a day (at about 9:00 a.m. and 2:00 p.m.). During these peak periods, a maximum of 72 trucks is anticipated, well within the receiving capacity of the Facility.

In the unlikely event that traffic flow should become a problem, APCI/BFI-controlled waste deliveries will be scheduled to arrive at other times than peak City deliveries, and/or scale house and tipping floor personnel will direct and expedite traffic flow and unloading operations.

4.5 FACILITY AVAILABILITY

Facility availability is the percent of time out of a year that the Facility can process waste at its design capacity.

An average systemwide on-line waste processing availability of 82 percent is anticipated for the Facility. This availability allows

for scheduled maintenance as well as unscheduled shutdowns and is based on actual operating experience with similar systems. Scheduled maintenance will consist of two 15-day shutdowns for each furnace/boiler per year for fireside cleanings, plus a 7-day-per-year allowance for an extended maintenance period, which would be scheduled every 4th year. This results in average scheduled outages of 37 days per year for each furnace/boiler. An additional 29 days per year of unscheduled shutdown is allowed for each furnace/boiler, resulting in each furnace/boiler being off-line a total of 66 days per year. The unscheduled outages will range in duration from a few hours to a few days.

The turbine will require minimum downtime amounting to about 5 days every other year for insurance and safety inspections. Turbine shutdowns will be scheduled to coincide with planned boiler maintenance in order to minimize impact on plant power production. In addition, it is expected that other repair, overhaul, and inspection procedures will be carried out during the same period. Scheduled outages for cleaning and repair procedures will be arranged, as much as possible, to coincide with periods of projected low steam demand.

Based on 82-percent availability, the following is a distribution of the Facility's processing capacity at the design waste-processing flow of 1,516 TPD:

NUMBER OF FURNACE/BOILER UNITS AVAILABLE FOR OPERATION	DAYS PER YEAR	TPD	TPY
2	245.4	1,516	372,026
1	107.8	750	81,712
none (backup landfill utilized)	11.8	0	0
	365		453,738

It should be noted that this representation of on-line processing capacity reflects the total of all expected outages. A given outage will commonly last from a few hours to 3 to 4 days. High Facility availability and the available storage capacity provide processing capacity sufficient to ensure reliable disposal of the City's waste.

The Facility will be similar to a conventional steam-generating facility -- the design philosophy will differ only as necessary to accommodate the fact that the fuel is solid waste. As is typical for any power station, the ancillary or supporting subsystems will be subject to normal wear and tear outages. To allow for these expected events, redundancy will be provided in the form of multiple cranes, multiple feedwater pumps, bifurcated-chute residue conveyors, and certain of the ancillary equipment. In addition, the system will be

equipped with a dump condenser capable of condensing all the steam produced, in the event it cannot be delivered or used for electricity generation. This assures that the boilers can be operated at all times for solid waste disposal, thus increasing the availability of the Facility. The waste feeding system will be an hydraulically powered unit with the attendant reliability of hydraulic systems. Each power pack will have a reserve hydraulic pump piped into the circuit.

The Duesseldorf Roller Grate has a worldwide reputation for reliability. Only the cast iron grate bars will require replacement, and then, only after more than 20,000 hours of operation.

Combustion fans and the air pollution control system (two, independent ESPs), are known in the power industry as highly reliable pieces of equipment. Periodic maintenance and overhaul are required; these procedures will be scheduled during normal repair and inspection outages.

4.6 ARCHITECTURAL TREATMENT

The architectural objective for the Facility is to provide an efficient, low-maintenance complex that will effectively house the diverse activities required to receive and process solid waste. The APCI/BFI architectural concepts are provided in Figure 4.2, the

FIGURE 4.2

ARTIST'S RENDITION OF THE FACILITY

artist's rendition. The architectural design of the Facility will be contemporary, embodying current design for industrial buildings. The various building units will be different sizes and heights and will be grouped to form one compact structure. The highest building unit, the boiler house, will be near the center of the structure and will be flanked on each side by lower building units. The Facility appearance will be similar when viewed from the Massachusetts Turnpike, the Southeast Expressway, local highways, and railroad lines near the site.

The Facility will consist of one main structure housing six distinct buildings. The scale house and guardhouse will be separate buildings located at the Facility entrance and exit. In general, the Facility will be a flat-roofed steel-framed structure, having concrete slab floors, steel grating platforms and catwalks, and steel deck roofs. The exterior enclosing walls will consist of concrete walls in selected areas at low elevation and systems of metal siding and translucent fiberglass panels mounted on steel girts attached to the structural steel frame. Siding panels will be insulated where required to reduce thermal and noise transmission. The exterior metal panels will have both modular flat and ribbed profiles, and both metal panels and translucent panels will have corrosion-resistant coatings.

The Facility roofs will be designed with slopes of approximately 1/8 inch per foot, to direct water to the drains. Roof construction will

consist of steel framing, which will support metal decking with rigid insulation, covered by a 20-year-type, built-up asphalt and felt-membrane roof with a gravel finish. The roof of the turbine building will have a concrete slab finish to provide a durable working surface for ESP maintenance.

Sanitary installations and plumbing will be provided as required for the operation of the Facility, and in accordance with applicable codes. The lighting system will generally consist of fluorescent, high-pressure sodium, and incandescent fixtures to provide proper illumination levels. Heating, ventilating, and air conditioning will be installed for personnel comfort and equipment protection.

All structures will be designed and constructed in accordance with the latest standards and building codes, and the more conservative requirements will govern a specific design area.

5. SOLID WASTE AND RESIDUE

The Facility will process 453,738 TPY of municipal solid waste (primarily household waste). The Facility will generate 113,734 TPY of residue (bottom ash and fly ash), on a wet basis, which will be disposed of at the MacDonald Brothers landfill in Halifax. Unprocessed waste due to Facility outage and any oversized bulky solid waste delivered to the Facility that is not processible will also be landfilled at the MacDonald Brothers landfill. Hazardous waste will not be accepted by the Facility.

The Facility has been designed to operate at a waste throughput of 1,516 TPD (with waste having a heating value 5,250 Btu/lb). The reference waste composition is given in Table 5.1. The waste composition and heating value were derived from an ultimate analysis for residential (household) waste adjusted for the effect of the Commonwealth container law and for the addition of high quality commercial waste from BFI's private waste collection service in the Boston area. Residential (household) waste will account for approximately 60 percent of the 453,738 TPY delivered to the Facility. The remaining 40 percent is commercial/institutional waste originating from such entities as airports, office buildings, universities, and shopping centers.

TABLE 5.1

REFERENCE WASTE COMPOSITION[a]
(Percent by Weight, As Received)

	RESIDENTIAL ULTIMATE ANALYSIS (UA)[b]	RESIDENTIAL UA ADJUSTED FOR 5% WEIGHT REDUCTION[c]	DERIVED COMMERCIAL UA	DESIGN COMPOSITE UA 60/40[d]
Moisture	22.0	23.16	12.0	19.1
Inerts	28.0	24.21	18.9	21.5
Carbon	24.7	26.00	35.1	29.8
Hydrogen	3.5	3.68	4.5	3.9
Oxygen	21.0	22.10	28.5	24.9
Nitrogen	0.5	0.53	0.4	0.4
Sulfur	0.1	0.11	0.1	0.1
Chlorine	0.2	0.21	0.5	0.3
TOTAL	100.0%	100.00%	100.0%	100.0%

a. Provided by APCI/BFI, September 1983.

b. As presented in the City's RFD.

c. Effect of Commonwealth container law.

d. A 60-percent residential and 40-percent commercial mix.

The remainder of this Section describes the municipal solid waste to be accepted at the Facility (Acceptable Waste). In addition, the types of waste that will not be accepted at the Facility (Unacceptable Waste) are described. Finally, the residue ash to be disposed of at the backup landfill is described.

5.1 ACCEPTABLE WASTE

APCI/BFI will accept all of the City's household waste, a portion of the commercial/institutional waste generated in the City, household waste from the surrounding communities of Cambridge and Waltham, Brookline, and BFI privately collected waste from Quincy. The City's household waste will have first priority for processing at the Facility.

Waste that is acceptable for processing at the Facility (Acceptable Waste) will include:

a. Solid waste which is collected and disposed of as part of normal residential waste collections, including: garbage, trash, rubbish, refuse, offal, beds, mattresses, sofas, refrigerators, washing machines, bicycles, baby carriages, and automobile and small vehicle tires.

b. Portions of commercial and industrial solid waste which APCI/BFI determines can be processed at the Facility.

c. Trees which are not more than 6 feet long or 1 foot in diameter, branches, leaves, twigs, grass, and plant cuttings.

d. Such other constituents which normally and regularly comprise residential waste and which are not Unacceptable Waste or Hazardous Waste as defined in Subsection 5.2.

5.2 UNACCEPTABLE WASTE

Waste that is not acceptable for processing at the Facility (Unacceptable Waste) will include:

a. Demolition debris, incinerator residue, motor vehicles, or their major parts.

b. Liquid or semi-solid materials collected and treated in a municipal sewerage system.

c. Any waste from commercial or industrial operations if such waste would cause a violation of the air emission criteria applicable to the Facility.

d. Any solid waste which a government agency or unit thereof having appropriate jurisdiction determines has a reasonable probability of posing a threat to the health or safety of the general public or the APCI/BFI's employees.

e. Hazardous Waste which will include: waste which as of the Contract Date between the City and APCI/BFI and by reason of its composition or characteristic is harmful, toxic, or dangerous and is hazardous waste as defined in either the Solid Waste Disposal Act, 42 U.S.C Sections 9601 *et seq.*, as amended, and the regulations thereunder or in Chapters 21C, 21D, and 21E of the General Laws of the Commonwealth of Massachusetts. If any governmental agency or unit having appropriate jurisdiction shall determine that substances which are not, as of the Contract Date, considered harmful, toxic or dangerous, are harmful, toxic or dangerous, then such substances will be Hazardous Waste.

5.3 RESIDUE

During the combustion process, the waste constituents are subject to high temperatures, melting, fusing, and volatilization. The end

product (residue) is a combination of fly ash and bottom ash, and is predictable as to its constituents.

The residue will be a mixture of metallic objects (mostly cans), loose fines, and an aggregate of variously sized glass fragments and fused cinders. The expected composite residue on a dry basis will have the following constituents*:

CONSTITUENT	PERCENT BY WEIGHT (dry basis)
Glass	29.0
Metallics	32.5
Heavy nonmetallics and heavy fines	13.5
Ash from combustibles and light fines	22.5
Unburned combustibles	2.5
TOTAL	100.0%

* Data provided by APCI/BFI, September 1983.

As exported to the landfill, the net residue will carry residue quench water of about 15 percent by weight. Putrescible content will be less than 0.2 percent. The residue will have a pH of 8.5 to 9.0 and will have a slight burnt odor. Typically, the residue is expected to have the composition presented in Table 5.2.

Toxicity testing of residue from municipal incinerators by EPA has revealed that when the bottom ash and fly ash are combined, such as in the proposed Facility design, the resultant product does not produce leachate that would cause the residue to be classified as hazardous.[1] Testing of residue (combined fly ash and bottom ash) from the Saugus facility was conducted by the University of Massachusetts in a landfill-type environment, and over 4 years of test data indicate that the ash residue is a relatively benign material as regards heavy metal leaching.[2] Prolonged exposure to ambient and rain conditions failed to produce significant heavy metal leaching. The residue exhibited a persistent neutralizing capacity (rainfall with a pH of 4.0 produced an ash leachate with a pH of near 7.0).

Specifically, the testing results have indicated:

- No additional contamination of groundwater from residue heavy metals.

TABLE 5.2

TYPICAL FACILITY RESIDUE (FLY ASH AND BOTTOM ASH) CHARACTERISTICS[a]

COMPONENT	CHEMICAL FORM	PERCENT BY WEIGHT (dry basis)
Silicon	SiO_2	44.9
Aluminum	Al	2.5
	Al_2O_3	4.9
Iron	Fe	23.2
Calcium	CaO	7.2
Magnesium	MgO	3.0
Titanium	TiO_2	1.4
Sodium	Na_2O	3.5
Potassium	K_2O	1.4
Chromium	Cr	0.03
Copper	Cu	0.6
Nickel	Ni	0.03
Lead	Pb	0.08
Tin	Sn	0.08
Zinc	Zn	0.5
Sulfates	SO_3^-	0.7
Chlorides	Cl^-	0.5
Carbonates	CO_3^-	1.7
Phosphates	P_2O_5	0.7
Barium	Ba	610 ppmw[b]
Manganese	Mn	410 ppmw
Molybdenum	Mo	20 ppmw
Arsenic	As	12 ppmw
Cadmium	Cd	25 ppmw
Cobalt	Co	30 ppmw
Antimony	Sb	78 ppmw
Scandium	Sc	5 ppmw
Selenium	Se	4 ppmw
Beryllium	Be	3 ppmw
Mercury	Hg	1 ppmw
PCDD[d]		72 ppbw[c]
TCDD[e]		2.4 ppbw
2, 3, 7, 8 TCDD[f]		0.24 ppbw
PCDF[g]		54 ppbw
TCDF[h]		12 ppbw

a. Data provided by APCI/BFI, September 1983.
b. Parts per million by weight.
c. Parts per billion by weight.
d. Polychlorinated dibenzo-p-dioxins.
e. Tetrachlorodibenzo-p-dioxins.
f. 2, 3, 7, 8 isomer of TCDD.
g. Polychlorinated dibenzo-furans.
h. Tetrachlorodibenzo furans.

- No significant increase in heavy metal concentrations in the soil beneath the residue piles.

Consequently, residue from the Facility is not expected to be hazardous. However, when the Facility is operational, residue will be tested in accordance with Commonwealth procedures to determine if it is to be classified as hazardous. If the residue is classified as hazardous, it will be disposed at an approved landfill, and measures will be taken to reduce or eliminate the hazardous constituents of the residue.

Efforts will be made by APCI/BFI to find productive uses for the residue, such as using the residue as landfill cover, aggregate for road building, and raw material in the manufacture of asphalt. Currently, however, markets for these uses do not exist in Massachusetts, and DEQE has not yet approved the use of residue as landfill cover material.

REFERENCES

1. "Resource Recovery Systems and the New RCRA Regs.," Carl Gunther, U.S. EPA, Washington, D.C., in Waste Age, February 1981.

2. (a) Letter from W. St. Hilaire, DEQE, to J. Shortsleeve, Massachusetts Bureau of Solid Waste Disposal, October 1, 1981.

   (b) "Summary Update of Research Projects with RESCO-Incinerated Residue, 1977-1981," Bureau of Solid Waste, Commonwealth of Massachusetts.

SECTION 6

6. ENVIRONMENTAL IMPACTS DURING OPERATIONS AND THEIR MITIGATION

In this Section, potential environmental impacts during Facility operations and planned mitigation measures are discussed in terms of: archeological and historical sites; water use and wastewater disposal; air quality; noise; traffic and transportation; and aesthetics.

6.1 ARCHEOLOGICAL AND HISTORICAL SITES

The Massachusetts Historical Commission has reviewed the proposed project and determined that the project will not affect significant cultural, historical, or archeological resources (see Figure 6.1).

6.2 WATER USE AND WASTEWATER DISPOSAL

An analysis was conducted of water use and wastewater disposal requirements. The analysis and its findings are summarized in this Subsection, and additional information and supporting calculations are provided in Appendices C and D in Volume II of this EIR.

MASSACHUSETTS HISTORICAL COMMISSION

COMMONWEALTH OF MASSACHUSETTS
Office of the Secretary of State

294 Washington Street
Boston, Massachusetts
02108
617-727-8470

MICHAEL JOSEPH CONNOLLY
Secretary of State

FIGURE 6.1

LETTER FROM
MASSACHUSETTS
HISTORICAL COMMISSION

September 29, 1983

NOV 2 3 1983

Joseph F. Casazza
Department of Public Works
Boston City Hall
Boston, MA 02201

RE: City of Boston Municipal Waste-to-Energy Plant EOEA #4820

Dear Mr. Casazza:

My staff has reviewed the materials received September 26, 1983, which you submitted describing the location of the proposed municipal waste-to-energy project at South Bay/Massachusetts Avenues in Boston.

After review of the material, it has been determined that your proposal will not affect significant cultural, historical, or archaeological resources.

This initial consultation to identify resources in the project area has been undertaken in accordance with 36CFR 800, the Advisory Council Regulations for the Protection of Cultural Resources, MEPA, and 950CFR 71, Procedures to Protect the Historic and Archaeological Properties of the Commonwealth. Since no significant resources were identified in the vicinity of the proposal, no further compliance with Council Procedures is required.

If you should have any questions, please contact Brona Simon or Joseph Orfant of this office. Thank you for your cooperation.

Sincerely,

Valerie A. Talmage

Valerie A. Talmage
Executive Director
Deputy State Historic Preservation Officer
Massachusetts Historical Commission

VAT/hi
xc: James S. Hoyte, EOEA, MEPA Unit

6.2.1 WATER USE

The Facility is designed to cogenerate steam and electricity. At the installed capacity of 1,516 TPD, the Facility will utilize between 198.5 gpm and 1,016 gpm depending on the amount of steam and/or the amount of electricity being generated. When the Facility is only generating electricity (i.e., with no export steam extraction), it will utilize 198.5 gpm. At maximum steam extraction and minimum electricity generation, the Facility will utilize 1,016 gpm. For most of the year, the Facility will operate at levels between the extremes presented, with maximum water use occurring during the winter months when the maximum amount of steam is sold to Boston Edison for the District Heating System, and minimum water use during the summer months when a minimum amount of steam is sold to Boston Edison.

Facility water use includes noncontact cooling water (e.g., cooling tower makeup water, cooling water for pumps, fans, and other water cooled equipment), process water (e.g., ash quench water, boiler feedwater, and water to wash down equipment and for other appropriate housekeeping uses), and sanitary water (e.g., sinks, showers, toilets). Details specifying water use are presented in Appendix C in Volume II of this EIR.

Water will be supplied to the Facility by the BWSC and the MDC. A 12-inch water main on South Bay Avenue currently serves the site and has adequate capacity (see Appendix C).

6.2.2 WASTEWATER DISPOSAL

Wastewater for discharge includes both blended process wastewater (cooling tower blowdown, demineralized wastes, demineralized backwash, and equipment washdown water) and sanitary wastewater (washrooms, showers, and sinks). As in the case of water use, the amount of blended process wastewater to be discharged will vary depending on the relative amounts of steam extracted and electricity generated. Blended process wastewater will be 28.5 gpm when the Facility is only generating electricity and 54 gpm when the Facility is at maximum steam extraction and minimum electricity generation. During most of the year, the blended process wastewater discharge will be between the extremes presented above, with maximum discharge occurring during the winter months, and minimum discharge during the summer months. Sanitary wastewater will be approximately 8 gpm during the year, and will not vary with Facility steam and electricity output.

Both the blended process wastewater and sanitary wastewater will be discharged to the BWSC 12-inch combined sewer on South Bay Avenue. Adequate capacity is available (see Appendix C in Volume II of this

EIR). All applicable Commonwealth, MDC, and BWSC requirements for such discharge will be met. The blended process wastewater will be treated prior to its discharge to the sewer. The wastewater treatment system will provide for storage, blending and neutralization, and oily water separation. A detailed description of the blended process wastewater discharge is provided in Appendix C. Sanitary wastewater will be discharged to the sewer system without treatment.

6.2.3 STORMWATER RUNOFF

Approximately 55 percent of the 7.7-acre site is currently impervious surface area (pavements, building roofs, and other structures). After development, about 80 percent of the site is expected to be impervious, representing an increase of 1.9 acres of impervious surface area.

Peak storm runoff was computed for a 25-year storm (rainfall intensity of 3.4 inches per hour) using the Rational Formula. Peak storm runoff is expected to increase from 18 to 23 cfs when the Facility is completed and the amount of impervious surface area on the site is increased. Detailed computations for stormwater runoff are presented in Appendix D in Volume II of this EIR.

Stormwater runoff from the site will be collected in area drains and discharged to the BWSC storm sewer on Southampton Street. Adequate capacity is available (see Appendix C in Volume II of this EIR).

6.2.4 IMPACTS AND MITIGATION MEASURES

6.2.4.1 Water Use

Projected demands for water use will not have any significant impact on the BWSC and MDC water supply.

The Facility's water requirements for providing steam to the District Heating System (its greatest water demand) and for providing electricity to Boston Edison will not constitute "new" water demands on the BWSC and the MDC water supply. Water used at the Facility for producing steam and electricity will displace a similar amount of water currently used by Boston Edison for steam generation to the District Heating System and for electricity generation. Consequently, the "new" water demand for the Facility (consisting of process wastewater and sanitary wastewater) will not exceed 62 gpm.

In addition, the Facility is designed to minimize water use by recycling water within the Facility wherever possible. Blended and treated process wastewater will be used as required for makeup water

to the ash quench tank. A wet/dry cooling tower will also be installed, which, when operating in either the dry mode or in the combined wet-dry mode, will reduce water use.

Finally, water use at the Facility will be at minimum demand during summer months (when Facility steam generation will be at its lowest), which is when the BWSC and MDC normally experience high water demand and the supply is most stressed.

6.2.4.2 Wastewater Disposal

The blended process wastewater and sanitary wastewater discharges will meet all criteria for discharge to the BWSC sewer system as specified by the Commonwealth, the BWSC, and the MDC. Consequently, the Facility will not adversely impact the BWSC's sewer and wastewater treatment systems.

To ensure that the wastewater discharge meets all requirements, the Facility will include a wastewater treatment system to treat the process wastewater.

The Facility design also incorporates means for recycling wastewater within the Facility to minimize the amount of wastewater discharge. Blended process wastewater will be used as makeup water to the ash

quenching operations, as required, thereby reducing process wastewater discharge to the sewer system.

6.2.4.3 Stormwater

There will be no significant increases in stormwater runoff (over current runoff levels at the site) from the Facility. The stormwater collection system will be designed to prevent runoff from the site from entering neighboring property. Stormwater will be discharged to the BWSC storm sewer on Southampton Street, which has adequate capacity.

6.3 AIR QUALITY

A comprehensive analysis has been conducted of the air quality impacts expected to result from Facility operations. The analysis was conducted in accordance with a preplanned protocol approved by DEQE. The air quality analysis and its findings are summarized in this Subsection, and a full report of the study is provided in Appendix E in Volume II of this EIR.

6.3.1 REGULATORY REQUIREMENTS

This Subsection summarizes the air quality regulations promulgated by DEQE and EPA. These regulations define ambient air quality standards and limit the emissions of air contaminants in order to achieve and maintain the ambient standards. A complete description of applicable regulations is provided in Appendix E in Volume II of this EIR.

The Facility is subject to the following federal and Commonwealth rules and regulations:

- National Ambient Air Quality Standards (NAAQS)
- Prevention of Significant Deterioration (PSD)
- Nonattainment Area Regulations
- New Source Performance Standards (NSPS)
- National Emission Standards for Hazardous Air Pollutants (NESHAPS)
- Massachusetts DEQE Air Pollution Control Regulations.

6.3.1.1 National Ambient Air Quality Standards (NAAQS)

EPA has established ambient standards, or ceilings, to protect public health (primary standards) and public welfare (secondary standards), which have been adopted by DEQE. Ambient standards exist for SO_2, total suspended particulates (TSP), nitrogen dioxide (NO_2), CO, photochemical oxidents, and lead (Pb); and a guideline ceiling has been set for nonmethane HC.

6.3.1.2 Prevention of Significant Deterioration (PSD)

EPA has established regulations for preventing significant degradation of air quality in "clean" areas, i.e., areas where air quality currently is better than the ambient standards. This is accomplished by limiting future emissions in the area such that air quality will never degrade by more than a specified increment over the baseline air quality levels. The EPA nondegradation limits are referred to as the PSD increments.

Because the Facility is a major source with potential emissions of regulated pollutants in excess of 100 tons per year, the Facility is subject to federal PSD requirements administered by DEQE. To

obtain the required PSD permit, an application must be filed providing the following information:

- Determination of Best Available Control Technology (BACT) for any pollutant emitted above small (*de minimus*) emission levels set by EPA.

- An analysis of existing ambient air quality, and an assessment of the need for ambient monitoring.

- A mathematical modeling analysis demonstrating that emissions from the new source in conjunction with other nearby sources will not cause a violation of ambient air quality standards or PSD increments.

- An assessment of the impact of the new source on soils/vegetation and visibility.

- Air quality impacts associated with indirect growth (e.g., traffic) created by the new source.

6.3.1.3 Nonattainment Area Regulations

An area where ambient air quality is not in compliance with the ambient standard for a given pollutant is referred to as a nonattainment area for that pollutant. EPA has promulgated rules

regarding planned new sources that would impact such areas, and DEQE has adopted the EPA nonattainment regulations. A major new source must meet certain requirements with respect to emissions of a pollutant(s) for which an area is nonattainment. The planned source must:

- Meet an emission limitation reflecting the Lowest Achievable Emission Rate (LAER) for such source.

- Certify that all existing major sources owned or operated by the applicant in the state are in compliance with all applicable emission limitations and standards.

- Obtain emission offsets such that there will be reasonable progress towards attainment of the applicable NAAQS.

- Demonstrate that the emission offsets provide a net air quality benefit in the affected area.

For waste-to-energy facilities, DEQE can grant a postponement for complying with the offset provisions if the permit applicant demonstrates that emission offsets are not immediately available. Once the offsets become available, they must be secured.

6.3.1.4 New Source Performance Standards (NSPS)

EPA has promulgated national emission standards for new or modified existing sources of air pollution. Pollutant-specific standards have been set for various categories of sources. For the incinerator category, an emission limitation was set on particulate matter. Specifically, large incinerators may not discharge flue gases that contain particulate matter in excess of .08 gr/dscf corrected to 12-percent CO_2. Emission monitoring requirements include daily charge rates and hours of operation.

EPA reviewed the NSPS for incinerators in 1979 and issued draft standards. The support document for this review concluded that available technology can generally meet a particulate emission rate of .05 gr/dscf at 12-percent CO_2. In addition, these draft standards would impose a limitation on opacity of 20 percent.

6.3.1.5 National Emission Standards for Hazardous Air Pollutants (NESHAPS)

EPA has published, and periodically updates, a list of hazardous air pollutants for which it has established national emission standards. Emission standards have been promulgated for pollutants emitted from various source types. For incinerators not burning wastewater

treatment plant sludge, NESHAPS will only apply for beryllium.

6.3.1.6 DEQE Air Pollution Control Regulations

DEQE regulations specifically limit the emissions of particulate from municipal incinerators. The pertinent regulation restricts the outlet grain loading from new municipal incinerators to .05 gr/dscf corrected to 12-percent CO_2, which is more stringent than the current federal standard.

The Facility must obtain a permit to construct from DEQE. Generally, the information supplied with the PSD application is sufficient for the DEQE permit. The permit application must include site information, plans, descriptions, specifications, and drawings showing the design of the facility, the nature and amount of emissions, and the manner in which the facility will be operated and controlled.

6.3.2 SITE METEOROLOGY

The climate of the Boston area can be described on the basis of historical meteorological data summaries for the Boston National Weather Service Office at Logan International Airport, located approximately 2 miles northeast of the Facility site. Average

temperatures, precipitation, and wind speed data for Boston Logan Airport are summarized in Table 6.1.

The climate of the region is continental; however, the Atlantic Ocean has a significant moderating effect. Sea breezes occur on hot spring and summer afternoons replacing the warm, predominating westerly air flow with a cool, moist east wind off the water. These breezes generally develop several hours after sunrise and persist for most of the afternoon. The region is situated near 42^{o}n latitude, in the prevailing westerlies, and the weather undergoes alternating intrusions of tropical and polar air masses. From late October to late April, major east coast storms bring significant rains and snows. During the warmer season of May through August, rainfall is mostly limited to showers and thunderstorms that accompany frontal passages. Thunderstorms occur on an average of 19 days during the year. On average, precipitation occurs 1 out of 3 days throughout the year.

The annual average precipitation at Boston is 43 inches. A maximum 24-hour value of 8.4 inches occurred in August 1955. The average annual snowfall is 42 inches; however, a monthly maximum snowfall of 41.3 inches occurred in February 1969.

The mean annual temperature in Boston is about 50^{o}F, but seasonal variations bring tropical warmth of 90^{o}F in the summer and polar cold near 0^{o}F in winter. The record minimum temperature of -12^{o}F was

TABLE 6.1

MONTHLY AND SEASONAL CLIMATIC SUMMARY[a] (Boston Logan Airport)

MONTH OR SEASON	AVERAGE DAILY MAXIMUM TEMPERATURE[b] (°F)	AVERAGE DAILY MINIMUM TEMPERATURE[b] (°F)	AVERAGE PRECIPITATION[c] (inches)	AVERAGE SNOWFALL[c] (inches)	AVERAGE WIND SPEED[d] (mph)
December	39.3	26.6	4.18	7.8	13.7
January	35.9	22.5	3.89	12.4	14.3
February	37.5	23.3	3.43	11.9	14.1
Winter	37.6	24.1	11.50	32.1	14.0
March	44.6	31.5	3.90	8.0	13.9
April	56.3	50.8	3.46	0.7	13.3
May	67.1	50.1	3.45	Trace	12.2
Spring	56.0	40.8	10.81	8.7	13.1
June	76.6	59.3	3.04	0.0	11.4
July	81.4	65.1	2.71	0.0	10.9
August	79.3	63.3	3.50	0.0	10.7
Summer	79.1	62.6	9.25	0.0	11.0
September	72.2	56.7	3.20	0.0	11.3
October	63.2	47.5	3.13	Trace	12.1
November	51.7	38.7	4.23	1.2	12.9
Fall	62.4	47.6	10.56	1.2	12.1

a. Source: Department of Commerce. National Oceanic and Atmospheric Administration: Local Climatological Data Annual Summary with Comparative Data, 1980, for General Logan International Airport, Boston, MA. 1980.
b. 1941 to 1970.
c. 1941 to 1980.
d. 1958 to 1980.

recorded in January 1957, and the record maximum was 102^{o}F recorded in July 1977. Freezing temperatures occur on an average of 99 days per year from mid-November through March.

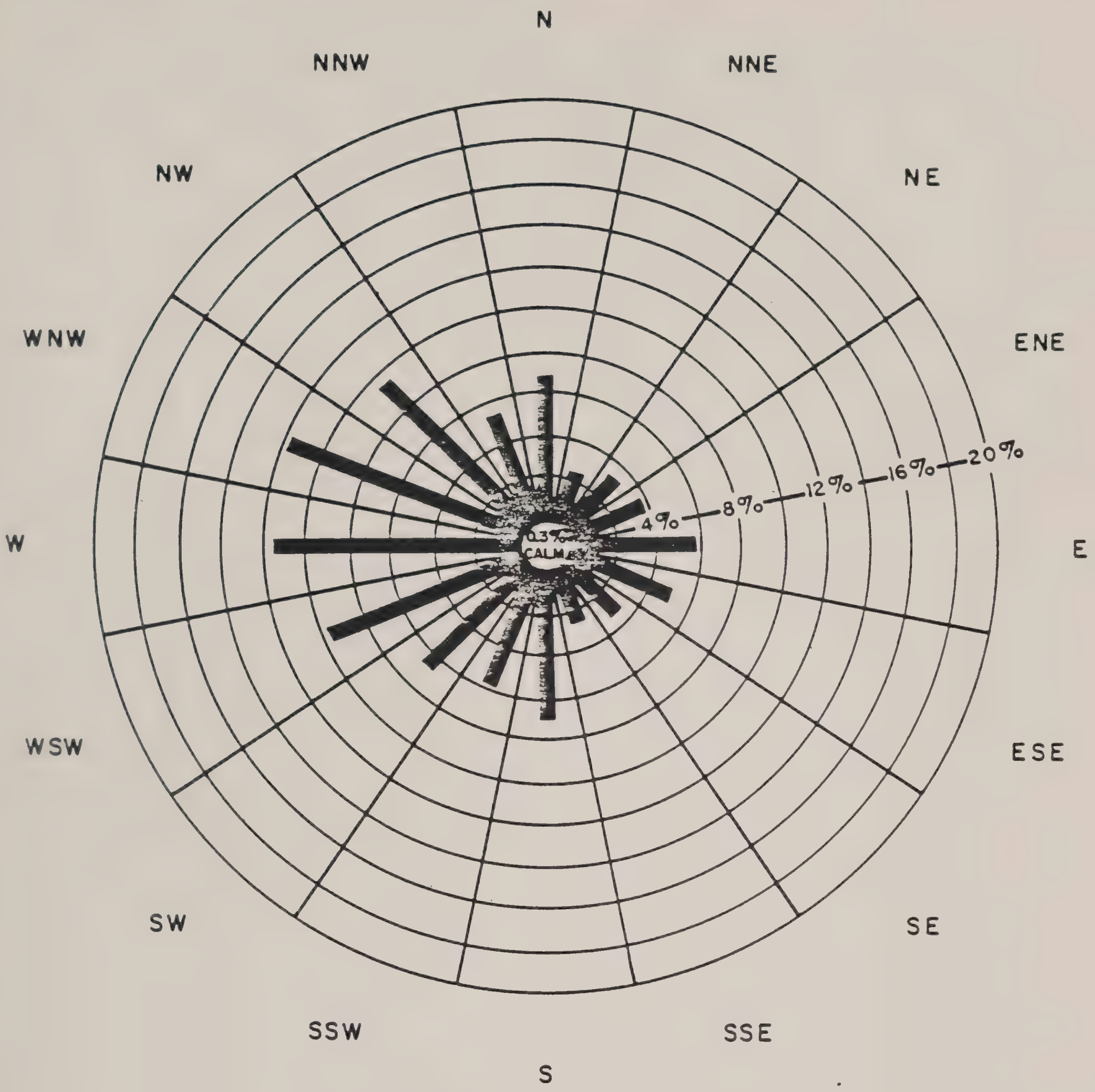
Dense fog occurs on the average of two times per month, and normally persists less than 1 day. The fog can lower visibility to 0.25 miles or less. The annual average relative humidity at Boston is 67 percent, and the daily peak relative humidity averages 72 percent.

Figure 6.2 depicts the annual frequency distribution of wind direction at Boston. The most frequent wind direction is west-northwest, and the least frequent is south-southeast. During the winter and spring seasons, the wind is predominately from the west-northwest. During the spring however, the frequency of wind directions from the northeast through (clockwise) southeast is significantly increased from winter because of the sea breeze influence. The most prevalent wind direction during the summer is west-southwest, and during the fall, the annual average hourly wind speed is 12.6 miles per hour, and calm conditions are infrequent. Wind speeds are highest during the winter.

Episodes of wind persistence for consecutive hours in a given direction are shown for Boston in Table 6.2. Persistence of wind for 12 hours or more occurs most frequently with winds from the west-southwest through (clockwise) west-northwest and from the north. Wind persistence for 12 hours or more is more common in winter than

FIGURE 6.2

ANNUAL FREQUENCY DISTRIBUTION (PERCENTAGE OCCURRENCE)
OF WIND DIRECTION FOR BOSTON (1970 - 1981)



NOTE
DIRECTION REPRESENTS SECTOR
FROM WHICH THE WIND BLOWS

SOURCE: National Climatic Center
Asheville, NC.

ANNUAL FREQUENCY DISTRIBUTION
(PERCENTAGE OCCURRENCE) OF
WIND DIRECTION FOR BOSTON,
MASSACHUSETTS (1970-1981)

TABLE 6.2

ANNUAL OCCURRENCES OF WIND PERSISTENCE EPISODES
PERIOD: 1/1/70 - 12/31/81
CONSECUTIVE HOURS OF PERSISTENCE

WIND FROM	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	TOTAL
N	621	312	185	94	62	49	34	20	17	8	5	4	1	5	6	2	4	2	0	1	2	0	0	0	0	0	1	1	0	0	1	1437
NNE	342	96	51	21	12	10	2	1	2	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	539
NE	376	151	64	42	25	8	9	5	6	3	3	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	693
ENE	399	180	91	37	23	9	13	8	7	1	2	1	3	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	777
E	628	296	161	109	64	38	21	18	7	4	4	3	2	0	0	0	1	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1358
ESE	525	316	139	82	54	30	10	11	2	2	2	2	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1178
SE	532	171	73	20	10	4	6	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	818
SSE	316	69	23	13	9	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	432
S	776	366	170	111	66	45	21	13	12	7	2	2	0	1	1	0	1	1	1	0	0	0	2	0	0	0	0	0	0	0	0	1598
SSW	695	305	144	89	34	22	12	7	2	0	4	2	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1320
SW	780	329	149	66	29	27	9	9	2	2	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1405
WSW	963	468	263	151	90	56	38	30	17	11	9	7	5	1	2	2	2	1	0	1	0	0	0	0	0	0	0	0	0	0	0	2117
W	1122	544	325	185	109	75	42	29	20	20	13	8	3	5	3	2	2	2	0	0	0	1	0	0	0	0	0	0	0	1	0	2511
WNW	1249	595	337	209	116	71	42	16	21	7	11	8	6	7	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2696
NW	1097	476	255	130	87	42	30	15	21	11	4	4	6	3	1	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2184
NNW	718	251	123	57	33	8	15	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1211
TOTAL	11,139	4925	2553	1416	823	495	304	185	140	78	59	43	30	27	17	7	11	6	1	2	3	1	2	0	1	1	2	1	0	1	1	22,274

in other seasons, and 27 episodes per year can be expected on average. The maximum wind persistence episode in the 12 years examined for Boston was 32 consecutive hours during the fall of 1978, with a wind direction from the north.

6.3.3 EXISTING AIR QUALITY

There are six major pollutants for which ambient standards have been developed: SO_2, TSP, CO, ozone, NO_2, and Pb. Background concentrations in the site area for each of these six pollutants are shown in Table 6.3 for comparison with the ambient standards, and the basis for these background values is indicated. In Boston, concentrations of SO_2, TSP, NO_2, and Pb are currently within the standards. The Boston area, however, is in violation of the standard for ozone. In addition, local monitoring data show that Boston currently exceeds the CO standards, although, as indicated in Table 6.3, CO background levels are projected to be within the standards in 1987.

Based on discussions with DEQE personnel, it has been determined that the network of monitoring stations now operating in Boston, and described in Table 6.4, is adequate to characterize air quality levels in the site area. No additional monitoring will, therefore, be required in conjunction with Facility construction or operation. For further description of the ambient monitoring locations in

TABLE 6.3

POLLUTANT BACKGROUND CONCENTRATIONS AND AMBIENT STANDARDS

POLLUTANT	AVERAGING PERIOD	BACKGROUND BASIS	BACKGROUND CONCENTRATION (ug/m^3)	NAAQS AND DEQE AMBIENT STANDARDS (ug/m^3)	
				Primary	Secondary
SO_2	3-hour	DEQE Kneeland Street monitor[a] (1982 second highest)	259	--	1,300
	24-hour	Spatial average of multiple Boston monitoring stations, plus modeled impacts from specific local background sources	167.3	365	--
	Annual	DEQE Kneeland Street monitor[a] (1981)	42	80	--
TSP	24-hour	DEQE Southampton Street monitor[a] (1980 second highest)	133	260	150
	Annual	DEQE Southampton Street monitor[a] (1980) (1981) (1982)	74 55 54	75	--
CO	1-hour	Projected by DEQE for 1987	3,230	40,000	--
	8-hour	Projected by DEQE for 1987	2,300	10,000	--
O_3	1-hour	DEQE Bremen Street monitor[a] (highest three values over 3 yrs)	284,235,229	235	--
NO_2	1-hour	DEQE Kenmore Square monitor[a] (1981 second highest)	367	320[b]	--
	Annual	DEQE Kenmore Square monitor[a] (1980)	93	100	--
Pb	Quarterly	DEQE Kenmore Square monitor[a] (1982)	1.08	1.5	--

a. Highest of the second-highest concentrations observed in each of 1980, 1981, and 1982.

b. DEQE guideline, not an ambient standard.

TABLE 6.4

POLLUTANT MONITOR LOCATIONS IN THE CITY OF BOSTON FOR THE YEARS 1980-1982

STATION	SAROAD NO.	LOCATION WITH RESPECT TO FACILITY SITE		CRITERIA POLLUTANTS MONITORED					NONCRITERIA POLLUTANTS MONITORED		
		Direction (°)	Distance (km)	SO_2	TSP	NO_2	CO	O_3	Pb	Sulfates	Trace Elements
DEQE Sites											
Kenmore Square	0002F01	300	3.0	x		x	x		x		
115 Southampton St.	0012F01	215	0.4		x					x	x
68 Central Sq.	0013F01	025	5.2		x						
Kneeland St.	0015F01	015	1.3	x							
Callahan Tunnel	0016F01	030	4.5			x	x	x			
340 Bremen St.	0011F01	005	4.9	x		x	x	x		x	
600 Washington St.	0022F01	010	2.1				x				
Morrissey Blvd.	0023F01	130	2.6	x							
200 Columbus Ave.	0024F01	350	1.7		x						
Private Sites[a]											
Dorchester	0020J02	160	2.8	x	x						
East Boston	0021J02	005	4.9	x	x						
Atlantic Ave.	0018J02	025	2.0	x	x					x	
Long Island	0019J02	105	8.0	x	x					x	

a. Monitoring stations operated by Boston Edison.

Boston, and details on the derivation of the background values presented in Table 6.3, see Appendix E in Volume II of this EIR. It should be noted that the background values used for the air quality analysis are the highest values from the most recent 3 years of DEQE monitoring data.

6.3.4 FACILITY IMPACTS

In this Subsection, analyses are provided of: the emissions from the Facility stack, their mitigation, and their impact; the cumulative impact of emissions from the Facility and other new or proposed sources in the area; the impact of emissions from truck traffic associated with Facility operations; and the potential for fugitive dust and odor impacts. Finally, the potential for fogging and icing impacts associated with cooling tower operations is addressed.

6.3.4.1 Stack Emissions and Mitigation

Estimates of pollutant emission rates are necessary to determine the regulatory significance of their magnitudes, as well as to assess applicable BACT and to determine air quality impacts. Pollutant emission rates from the Facility have been estimated based on the design maximum processing rate of 1,516 TPD of waste, 365 days per year. Hourly and annual emission rates are listed in Table 6.5, with

TABLE 6.5

ESTIMATED POLLUTANT EMISSIONS FOR THE FACILITY

POLLUTANT	HOURLY EMISSIONS[a] (lbs/hr)	ANNUAL EMISSIONS	
		100% Availability[b] (tons/yr)	82% Availability[c] (tons/yr)
<u>Criteria Pollutants</u>			
Particulate Matter	72	315	258
SO_2	144	630	517
NO_x (as NO_2)	190	833	683
CO	33.1	144	118
Nonmethane HC, as Methane	4.7	20.8	17.1
Pb	1.6	6.9	5.7
<u>Noncriteria Pollutants</u>			
Asbestos	ND[d]	ND	ND
Beryllium	8.3×10^{-4}	$4. \times 10^{-3}$	3.3×10^{-3}
Mercury	0.19	0.83	0.68
Vinyl Chloride	ND	ND	ND

a. Based on the design maximum processing rate of 1,516 TPD (63.2 tons per hour).

b. Based on the design maximum processing rate, 365 days per year (100% availability).

c. Based on the design processing rate, but reflects the expected Facility availability of 82% on an annual basis.

d. ND = Not detectable, emission essentially zero.

TABLE 6.5 (continued)

POLLUTANT	HOURLY EMISSIONS[a] (lbs/hr)	ANNUAL EMISSIONS	
		100% Availability[b] (tons/yr)	82% Availability[c] (tons/yr)
Fluorides (as HF)	4.4	19.4	15.9
Sulfuric Acid Mist	4.4	19.4	15.9
Hydrogen Sulfide (H_2S)	ND	ND	ND
Total Reduced Sulfur (includes H_2S)	ND	ND	ND
Reduced Sulfur Compounds (includes H_2S)	ND	ND	ND
<u>Other Acid Gases</u>			
HCl	259	1134	930
<u>Other Trace Metals</u>			
Antimony	0.20	0.87	0.71
Arsenic	0.04	0.17	0.14
Barium	0.025	0.11	0.09
Cadmium	0.10	0.43	0.35
Chromium	0.037	0.16	0.13
Cobalt	2.5×10^{-3}	0.011	0.009
Copper	0.114	0.50	0.41
Nickel	0.019	0.083	0.078
Scandium	1.5×10^{-3}	6.4×10^{-3}	5.2×10^{-3}
Selenium	0.016	0.07	0.06

TABLE 6.5 (continued)

POLLUTANT	HOURLY EMISSIONS[a] (lbs/hr)	ANNUAL EMISSIONS 100% Availability[b] (tons/yr)	ANNUAL EMISSIONS 82% Availability[c] (tons/yr)
Zinc	2.64	11.5	9.4
Other Trace Organic Compounds			
PCDD	3.79×10^{-4}	1.66×10^{-3}	1.36×10^{-3}
TCDD	1.26×10^{-5}	5.53×10^{-5}	4.53×10^{-5}
2, 3, 7, 8 TCDD	1.3×10^{-6}	5.5×10^{-6}	4.5×10^{-6}
PCDF	2.84×10^{-4}	1.245×10^{-3}	1.021×10^{-3}
TCDF	6.3×10^{-5}	2.77×10^{-4}	2.27×10^{-4}
Polynuclear Aromatic Hydrocarbons (PAH)	0.019	0.083	0.068
Aldehydes (as formaldehyde)	1.9	8.3	6.8
Organic Acids (as acetic acid)	3.79	16.6	13.6

annual emissions given for both the expected Facility availability (82 percent) and for 100-percent availability. Operation of the Facility at 100-percent availability is unlikely to occur; however, use of this availability level provides a conservative analysis.

Emission rates have been quantified for all pollutants known to be emitted from municipal incinerators and/or from resource recovery facilities that burn refuse. Emission rates are given for federally regulated (criteria and noncriteria) pollutants, as well as for other pollutants not currently subject to federal regulation. Of the regulated pollutants, criteria pollutants are those for which federal ambient standards exist. There are no federal ambient standards for noncriteria pollutants, but emission rate regulations are applicable.

The emission rates shown in Table 6.5 are based on emission factors (mass of pollutant emitted per unit mass of refuse burned) that have been derived from a number of data sources, and assume the installation of an ESP to control stack emissions of particulate matter to .05 gr/dscf at 12-percent CO_2. The emission rates were developed based primarily on: data from operating DBA facilities incorporating the same mass-burning technology; a review of emission data from other similar operating facilities; the projected waste composition and design data for the Facility; and a review of the technical literature, including the EPA BACT clearinghouse documents. Municipal waste is a heterogeneous material, and air pollution

emissions can vary. The emission factors used represent the middle of the range of available data.

A detailed evaluation of emission control equipment was conducted for the Facility during the BACT analysis for the PSD permit application. A BACT analysis evaluates control technology from the standpoint of reliability, environmental benefits, and economics. For those listed pollutants with emissions in excess of the EPA Significant Levels (see Table 6.6), an analysis of BACT is required and has been performed. In addition, DEQE requested that a BACT analysis be conducted for acid gas emissions. The BACT analysis document is included as Appendix F in Volume II of this EIR.

Emission control technologies evaluated for the Facility included:

- ESPs
- Dry scrubber, with ESP
- Dry scrubber, with baghouse
- Wet scrubber, with ESP.

The ESP controls stack emissions of particulate matter. The other three technologies accomplish this, but also reduce emissions of such stack gases as SO_2 and acid gases [e.g., hydrochloric acid (HCl)].

TABLE 6.6

FACILITY EMISSION RATES VERSUS EPA SIGNIFICANT LEVELS

POLLUTANT	SIGNIFICANT EMISSION RATE[a] (tons/year)	ANNUAL EMISSIONS 100% AVAILABILITY[b] (tons/year)
Particulate matter	25	315
CO	100	145
NO_x	40	833
SO_2	40	631
Volatile organic compounds	40	20.8
Pb	0.6	6.9
Asbestos	0.007	negligible
Beryllium	0.0004	0.0037
Mercury	0.1	0.83
Vinyl chloride	1.0	negligible
Fluorides	3	19.4
Sulfuric acid mist	7	19.4
Total reduced sulfur (including H_2S)	10	negligible
Reduced sulfur (including H_2S)	10	negligible
H_2S	10	negligible

a. Source: 40 CFR 52.21 (b)(23)

b. Based on the design maximum processing rate, 365 days per year (100% availability).

The Facility's air quality impact was projected based on each of the four technologies. The evaluation indicated that installation of ESP technology would result in compliance with all air quality standards and in emission levels that would protect the public health and welfare. Therefore, additional control equipment for SO_2 and acid gases would not be necessary. However, the Facility design provides space for the installation of gas scrubbing equipment should this become necessary in the future. Emissions of asbestos, Pb, and beryllium, as well as other trace metals listed in Table 6.5, will be reduced by the ESP. In addition, dioxin and furan emissions will be reduced because these compounds are absorbed onto particulate matter and are removed with the particulate.

Complete combustion of the waste material will eliminate smoke; minimize emissions of CO and HC; and reduce, via thermal destruction, volatile organic compounds, trace organic compounds, such as dioxins and furans, and odorants, such as H_2S. Complete combustion will be achieved during the combustion process at the Facility by continuous mixing of the waste during combustion, and the long residence time of the combustion gas in the furnace to the first boiler pass (4 to 8 seconds) at high temperatures (1400^{o}F to 1900^{o}F). While the temperature must be maintained above 1400^{o}F for complete combustion, it must be kept below 1900^{o}F to preclude significant formation of NO_x. Furnace temperature will be maintained above 1400^{o}F, normally near 1800^{o}F. Combustion gas residence time at 1800^{o}F will be 1 to 2 seconds. To restrict the temperature to a maximum of 1900^{o}F,

heat-absorbing waterwalls protected with plastic refractory will be installed on the sides and roof of the combustion grate enclosure.

The Facility operators will mitigate emissions of some pollutants by diverting certain identifiable waste items (e.g., tires) from the Facility. For example, diversion of tires will mitigate emissions of SO_2, HCl, and zinc.

6.3.4.2 Stack Impacts

6.3.4.2.1 Approach. The air quality impacts resulting from Facility stack emissions were estimated using mathematical dispersion models. Such models are used to simultate the pollutant emissions from the stack, the subsequent transport and dilution of the pollutant plume, and the groundlevel concentrations expected at specified locations (receptors) downwind. The concentrations are calculated by the model as a function of the height, rate, velocity, and temperature of pollutant emissions; meteorological factors; and topographical influences. Once the Facility impacts are calculated, these are added to the background concentrations to give projected air quality levels for comparison with ambient standards.

The EPA Industrial Source Complex Model (ISC) was used to calculate the impact from the Facility and also from significant background

sources in the Boston area. The model has the capability to simulate terrain and urban effects on plume dispersion. In addition, it can simulate building-wake effects that result when pollutant release height is less than good engineering practice (GEP) height, as will be the case at the Facility. (A stack of GEP height is not necessary at the Facility to achieve acceptable air quality impact, and a Facility stack lower than GEP height presents less opportunity for interference with aircraft utilizing Logan Airport. Preliminary approval has been granted by FAA for a stack height of up to 280 feet; see Appendix K in Volume II of this EIR). The ISC model was applied using surface meteorological data (wind direction, wind speed, temperature, stability) from Logan Airport at Boston, and mixing-depth data based on upper air observations from Portland, Maine. Five years (1977-1981) of hour-by-hour meteorological data were input to the model.

Facility emission and engineering data are also required inputs to the ISC model. The Facility emission data that were input to the ISC model are the values listed previously in Table 6.5 for maximum hourly and annual (assumed 100-percent availability) emission rates. The stack engineering data input to the model are summarized in Table 6.7.

A screening analysis of Facility impacts was initially performed with the ISC model using preselected ranges and combinations of meteorological data as input. Based on the results, it was

TABLE 6.7

STACK PARAMETERS FOR THE FACILITY

PARAMETER	VALUE
Height (m)	82.3
Inside Diameter (m)	
• One flue	2.44
• Two flues	3.44[a]
Outside Diameter (m)	6.71
Flue Gas Rate (m/s)	
• Maximum load[b]	17.9
• Reduced load[c]	12.0
• Minimum load[d]	17.9
Flue Gas Temperature (^{o}K)	
• Maximum load	484.1
• Reduced load	466.3
• Minimum load	484.1
Stack Base Elevation (ft msl)	20.
Stack Location (m)	
• UTM - East	329600.
• UTM - North	4688750.

a. The diameter of a circle whose area is the same as the sum of the areas of the individual flues; used when both boilers are operating.

b. Two boilers operating at 100-percent capacity.

c. Two boilers operating at 70-percent capacity.

d. One boiler operating at 100-percent capacity.

determined that maximum operating capacity, rather than reduced or minimum loading (see Table 6.7), would result in greatest Facility impacts. The screening analysis results were also used to design a suitable receptor grid for the subsequent refined modeling of Facility impacts. This grid was composed of 165 receptors on a polar array extending to 3.1 miles (5 kilometers) from the Facility, and included additional receptors at DEQE monitoring sites. This grid was supplemented with other receptor locations in Boston that had been utilized in an earlier study of the proposed conversion of Boston Edison power plants to coal firing, permitting assessment of the cumulative impacts of the Facility and major background sources in the area.

SO_2 emissions were modeled for the maximum operating load with the ISC model using the 5 years of meteorological data and the receptor grid. Concentrations for all other pollutants were scaled from the modeled hourly SO_2 concentrations by the ratio of the pollutant/SO_2 emission rates. Background sources included in the cumulative SO_2 impact evaluation are identified in Table 6.8. Details of the ISC model application are presented in Appendix E in Volume II of this EIR.

6.3.4.2.2 Stack Impacts for Criteria Pollutants. The results of the modeling analysis comparing Facility stack impacts with all allowable increments and ambient standards are summarized below.

TABLE 6.8

SO_2 BACKGROUND SOURCES

BACKGROUND SOURCE	LOCATION WITH RESPECT TO FACILITY	
	Distance (km)	Direction (degrees)
Revere Sugar	5.37	5
General Electric	15.2	33
Exxon	7.27	5
Gillette	0.53	229
Cambridge Electric		
• Kendall Square	3.28	344
• Blackstone Street	5.10	312
MATEP	3.32	276
Boston Edison		
• Kneeland Street	1.97	27
• Mystic	6.43	1
• New Boston	2.74	81
MIT	3.65	327
NEPCO (Salem Harbor)	26.5	38
Diamond International	9.60	211
Monsanto	7.15	360

Facility maximum impacts are compared to PSD increments established by EPA for SO_2 and TSP (see Table 6.9). Because of high annual TSP background levels [74 micrograms per cubic meter (ug/m^3)], the maximum increment available for TSP is 1 ug/m^3. Currently, there are no existing or proposed sources other than the Facility making a claim on the available increments. Therefore, the increment consumption analysis is based solely on SO_2 and TSP impacts from the Facility. The results indicate that the Facility impacts will not exceed the available increments. Moreover, with respect to SO_2 impacts, there will be ample room for future growth in Boston after the Facility is built. Because of the high background TSP value used in this analysis (based on 1980 monitoring data), minimal growth potential is indicated for future sources that are major emitters of particulate matter. If, however, TSP background were to be based on more recent monitoring data from 1981 and 1982 (see Table 6.4), the available TSP increment would be 19 ug/m^3 larger, and the growth potential substantially greater than indicated in this conservative assessment.

Future air quality levels were calculated by adding the Facility impacts to the pollutant background concentrations. The projected air quality levels were then compared with the ambient standards to determine compliance. In Table 6.10, projected air quality levels for SO_2, TSP, CO, NO_2, and Pb are compared with the ambient standards for these pollutants. The results indicate that the standards for all pollutants will not be exceeded. As noted previously, the annual

TABLE 6.9

PSD INCREMENT CONSUMPTION

POLLUTANT	AVERAGING PERIOD	PSD INCREMENT (ug/m^3)	AVAILABLE INCREMENT (ug/m^3)	MAXIMUM CONCENTRATION[a] (ug/m^3)
SO_2	3-hour	512	512	16.6
	24-hour	91	91	8.5
	Annual	20	20	0.80
TSP	24-hour	37	17	4.3
	Annual	19	1	0.40

a. Highest of the second-highest 3-hour and 24-hour concentrations calculated in each of the 5 years modeled, and the highest annual concentrations.

TABLE 6.10

PROJECTED AIR QUALITY VERSUS AMBIENT STANDARDS

POLLUTANT	AVERAGING PERIOD	CONCENTRATIONS (ug/m^3)			
		Ambient Standard	Background	Facility Impact[a]	Total Projected Air Quality
SO_2	3-hour	1,300[b]	259	16.6	275.6
	24-hour	365	167.3[c]	5.7	173.0[d]
	Annual	80	42	0.8	42.8
TSP	24-hour	260 (150[b])	133	4.3	137.3
	Annual	75	74	0.4	74.4
CO	1-hour	40,000	13,551	226[e]	13,777
	8-hour	10,000	9,524	157[e]	9,681
NO_2	Annual	100	93	1.1	94.1
Pb	Quarterly	1.5	1.08	0.017	1.1

a. Values shown are highest of the second-highest 3-hour and 24-hour concentrations calculated in each of the 5 years modeled, and the highest of the annual concentrations.

b. Secondary standard.

c. Includes model-calculated contribution from background SO_2 sources (see Table 6.8).

d. Represents the highest combination of background concentration and Facility impact.

e. Is the combined impact of CO emissions from Facility stack and Facility-generated traffic.

TSP background was conservatively based on high concentrations monitored locally in 1980. If the TSP background were to be based on monitoring data observed in 1981 and 1982, the projected annual TSP concentration would be 55 ug/m^3, well under the standard of 75 ug/m^3. The combined impact of CO emissions from the Facility stack and Facility-generated traffic are discussed in detail in Subsection 6.3.4.3.1.

6.3.4.2.3 Stack Impacts for Noncriteria and Other Pollutants. The Facility emits certain pollutants, including acid gases, trace metals, and trace organic compounds, for which no ambient standards have been established. Table 6.11 provides a list of these pollutants, their maximum emission rates, and maximum air quality impacts.

An evaluation of the potential health effects associated with hazardous pollutant emissions from the Facility has been completed. The full report of the analysis is included in Appendix G in Volume II of this EIR, and the findings are summarized below.

Health effects from air pollutants can be divided into acute effects (toxic effects from short-term exposure), chronic effects (toxic effects from long-term exposure), and, as a special case, carcinogenic effects. For the acute and chronic (but noncarcinogenic) effects, the concept of a no adverse effect level (NOAEL) serves as a benchmark with which to compare the estimated

TABLE 6.11

NONCRITERIA AND OTHER POLLUTANT EMISSIONS AND MAXIMUM IMPACTS

POLLUTANT	FACILITY EMISSIONS		1-HOUR CONCENTRATIONS (ug/m^3)	24-HOUR CONCENTRATIONS (ug/m^3)	ANNUAL CONCENTRATIONS (ug/m^3)
	lb/hr	tons/yr			
Asbestos	Not detectable		--	--	--
Beryllium	8.3×10^{-4}	0.004	1.3×10^{-4}	5.5×10^{-5}	4.6×10^{-6}
Mercury	0.19	0.83	.031	.013	.001
Vinyl Chloride	Not detectable		--	--	--
Fluorides (as HF)	4.4	19.4	0.71	.293	.024
Sulfuric Acid Mist	4.4	19.4	0.71	.293	.024
HCl	259	1,134	41.9	17.3	1.44
Total Reduced Sulfur	Not detectable		--	--	--
Reduced Sulfur Compounds	Not detectable		--	--	--
H_2S	Not detectable		--	--	--
Antimony	0.20	0.87	.032	.013	.001
Arsenic	0.04	0.17	.006	.003	2×10^{-4}
Barium	0.025	0.11	.004	.002	1×10^{-4}
Cadmium	0.10	0.43	.016	.007	6×10^{-4}
Chromium	0.037	0.16	.006	.002	2×10^{-4}
Cobalt	0.0025	0.011	4×10^{-4}	1.7×10^{-4}	1.4×10^{-5}
Copper	0.114	0.50	.018	.008	6×10^{-4}
Nickel	0.019	0.083	.003	.001	.0001
Scandium	1.5×10^{-3}	6.4×10^{-3}	2×10^{-4}	.0001	8×10^{-6}
Selenium	0.016	0.07	.003	.001	9×10^{-5}
Zinc	2.64	11.5	.427	.176	.015
PCDD	3.79×10^{-4}	1.66×10^{-3}	6.1×10^{-5}	2.5×10^{-5}	2.1×10^{-6}
TCDD	1.26×10^{-5}	5.53×10^{-5}	2.04×10^{-6}	8.4×10^{-7}	7×10^{-8}
2, 3, 7, 8 TCDD	1.3×10^{-6}	5.5×10^{-6}	2.1×10^{-7}	8.7×10^{-8}	7×10^{-9}
PCDF	2.84×10^{-4}	1.245×10^{-3}	4.6×10^{-5}	1.9×10^{-5}	1.6×10^{-6}
TCDF	6.3×10^{-5}	2.77×10^{-4}	1.0×10^{-5}	4.2×10^{-6}	4×10^{-7}
PAH	0.019	.083	.003	.001	1×10^{-4}
Aldehydes	1.9	8.3	0.31	0.13	0.01
Organic Acids	3.79	16.6	0.613	0.253	0.02

doses from the Facility. Carcinogenic effects are a special case because it is believed by many that there is no threshold of exposure below which all risk is absent.

During discussions with DEQE, they requested that potential impacts of arsenic, cadmium, hydrogen chloride, and trace organics be evaluated. After considering the emissions and air quality impacts for the pollutants in Table 6.11, the health effects analysts added beryllium, chromium, and nickel to the DEQE list for detailed study, and considered the polychlorinated dibenzodioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs) among the trace organics.

To assess the possible toxic (noncarcinogenic) effects from exposure to Facility emissions, maximum Facility short-term concentrations were compared with federal occupational standards. This comparison, as shown in Table 6.12, indicates that Facility impacts are considerably less than the levels established by the standards in all cases, as evidenced by the safety factors shown in Table 6.12. For arsenic, an NOAEL was developed based on data from animal toxicity studies. The Facility impact for arsenic was well below the NOAEL. Based on this analysis, it was concluded that Facility emissions would not be expected to result in any acute or chronic (noncarcinogenic) health effects.

Upper-bound (not to be exceeded, likely to be less) estimates of carcinogenic risk associated with continuous exposure for a lifetime

TABLE 6.12

FACILITY IMPACTS OF TRACE METALS AND HCl VERSUS OCCUPATIONAL STANDARDS

POLLUTANT	1-HOUR FACILITY IMPACT (ug/m^3)	NOAEL (ug/m^3)	8-HOUR OCCUPATIONAL STANDARD (ug/m^3)	SAFETY FACTOR
Arsenic	.006	.47	200	33,000
Beryllium	1.3×10^{-4}	--	2000	154,000
Cadmium	.016	--	50	3,100
Chromium	.006	--	1	167
Hydrogen Chloride	~40	--	7000	175
Nickel	.003	--	100	33,000

(70 years) to Facility impacts were developed. The analysis utilized risk estimates prepared by the EPA Carcinogen Assessment Group and considered the distribution of the Facility annual concentration impacts relative to the distribution of Boston's population. Results of the analysis are summarized in Table 6.13. The highest risk for any of the pollutants (chromium) is about one cancer case per million people exposed for a 70-year period. The combined risk from exposure to all of the pollutants is of the same order of magnitude, which is a level that is considered acceptable by the Carcinogen Assessment Group of EPA.

Risk assessment is a means of comparing the relative degree of hazard to human health at certain exposure levels in the environment. To establish a perspective on the order of magnitude of the risk of one cancer case in a population of 1,000,000, this risk is compared to the following voluntary and involuntary risks:

Voluntary Risks	Anticipated Deaths per Million Population per Year
Drinking (1 bottle wine/day)	75
Smoking (20 cigarettes/day)	5,000
Motorcycling	20,000

TABLE 6.13

UPPER-BOUND ESTIMATES OF RISK
DUE TO FACILITY EMISSIONS

POLLUTANT	CANCER CASES PER MILLION POPULATION EXPOSED FOR A LIFETIME (70 YEARS)
Arsenic	0.3
Beryllium	0.0031
Cadmium	0.6
Chromium	1.2[b]
Hydrogen Chloride[a]	--
Nickel	0.02
PCDD + PCDF	0.02

a. Hydrogen chloride is an irritant, not a carcinogen.

b. Assumes all chromium emitted is in the hexavalent form and is completely absorbed by the body.

Involuntary Risks	Anticipated Deaths per Million Population per Year
Earthquake (California)	1.7
Tornados (Midwest)	2.2
Floods (US)	2.2
Influenza	200.0

Other common risks faced by the general public are indicated by the 1978 National Safety Council statistics as follows:

Accidents	Deaths per Million Population in the U.S.
Motor Vehicle	250
In the Home	100
In Public (drownings, etc.)	100
At Work	65

6.3.4.2.4 Impacts on Visibility, Soils/Vegetation, and Growth. The Clean Air Act Amendments of 1977 require an analysis of impacts from new facilities on visibility, soils/vegetation, and growth. A study of Facility impacts in these areas has been performed, and the findings are described below. Details of the analysis are presented in Appendix E in Volume II of this EIR.

Visibility. The potential impacts on visibility at Federal Class I areas (designated pristine areas) must be estimated for new sources. EPA defines visibility impairment as any humanly perceptible change in visibility (visual range, contrast, coloration) from that which would have existed under natural conditions. Visibility impairment is manifested as either a general reduction in visual range (haze) or the presence of a visible plume (plume blight). An analysis of Facility impacts on visibility has been carried out following the EPA recommendations for visibility analyses as contained in the "Workbook for Estimating Visibility Impairment" (EPA-450/4-80-031).

A Level I screening procedure (the most conservative of three levels) was applied to verify that the Facility has no potential for adversely affecting visibility in the nearest Class I area. In this case, the nearest Class I area is the Lyle Brook Wilderness Area, (Vermont) about 110 miles northwest of the Boston area. The results verified that there is no possibility of Facility emissions causing visibility impairment of any sort at the nearest Class I area.

Soils/Vegetation. The impact of Facility emissions on vegetation in Boston has been analyzed. Vegetation in the vicinity of the Facility includes species common to urban Boston street tree plantings, to vacant lots, and to urban parks. There is limited vegetation in the immediate area of the Facility site. In the heavily developed areas of Boston, vegetative species such as Tree of Heaven (Ailanthus altissima), cottonwood, and ragweed are present in small unpaved

areas and crevices of paved areas or adjacent to building foundations. These weedy species are common in this urban setting because they are vigorous and adaptable species that thrive where other plants cannot compete or survive.

The vegetation in the maximum short-term Facility impact areas of Telegraph Hill in South Boston and Parker Hill in Back Bay is primarily street tree and landscape plantings. Norway maple, little leaf linden, sycamore, ash, and pin oak are common street and shade trees on Telegraph Hill and in Thomas Park. The Parker Hill residential area has a diversity of trees and shrubs, such as Norway maple, oaks, willow, blue spruce, privet, lilac, Catalpa, and juniper species. In addition to their aesthetic value, street trees such as Norway maple, pin oak, and linden have been planted because of hardiness with respect to insects and disease and urban stresses, such as air pollutants, drought, road salts, and soil compaction. In contrast to most of urban Boston, areas such as Back Bay Fens, Boston Public Gardens, and Arnold Arboretum are significant vegetative islands in the urban environment that support a diversity of both native and introduced plant species.

In general, if air pollution emissions are less then the NAAQS, vegetation is protected from air pollution damage, although vegetation injury has been reported on sensitive species with air quality levels less then the NAAQS standards. A literature search was, therefore, conducted to assemble research findings regarding the

susceptibility of the various vegetative species found in Boston (including home-garden vegetables) to pollutants emitted from the Facility. Ambient concentrations of these pollutants projected with the Facility in operation were compared with the no-injury concentrations identified for each vegetative species. Results indicated that Facility emissions pose no significant threat to vegetation found in Boston.

Growth. No significant change in employment, population, housing, or commercial/industrial development will result from the Facility. As a result, there will be no indirect pollutant emissions associated with operation of the Facility, except for traffic-related emissions, which are discussed in Subsection 6.3.4.3.

The Facility will employ approximately 44 persons. It is anticipated that a majority of these personnel requirements will be filled from within the local labor force. In-migration to the area is, therefore, not anticipated. As a result, no significant increase in population in the area will occur because of the Facility.

The project does not require the destruction, relocation, or alteration of any residential property in the area, nor will there be any significant change in demand for housing units in the area.

6.3.4.3 Traffic-Related Emission Impacts

Waste delivery trucks, residue trucks, and employee vehicles are sources of pollutant emissions that will result indirectly from Facility operations. EPA has issued guidelines for evaluating the impact of vehicular indirect sources.[1] For vehicular emissions in urban areas, the primary pollutant of concern, in terms of localized impacts, is CO. This is particularly true in Boston because the City is currently designated as a nonattainment area for CO, with monitoring data in many City locations currently indicating violations of the CO air quality standards.

In addition, the Boston area and much of the central and southern New England region are in violation of the ozone air quality standard. On a regional basis, therefore, vehicular emissions of HC and NO_x are of most concern because these pollutants are precursors to the formation of ozone. The local and regional impacts of emissions from Facility-related traffic are discussed below.

6.3.4.3.1 Local Impacts. Using the EPA guidelines, an indirect source analysis was carried out to determine the existing and predicted air quality levels for CO at local "hot spots" in the vicinity of the Facility site. Hot spots are those locations where ambient CO levels are expected to be highest as a result of the combination of the background CO levels and the impact from Facility-related traffic.

Two intersections in the immediate vicinity of the project area were selected for study as representing "worst-case" traffic patterns anticipated for vehicles accessing the Facility. These intersections are:

- Massachusetts Avenue at Albany Street.

- Massachusetts Avenue at Melnea Cass Boulevard at the Southeast Expressway ramps.

Consistent with the EPA indirect source guidelines, these intersections are located approximately within a 0.25-mile radius of the Facility (see Figure 6.3), and represent areas that the general public might normally frequent. A particular location to analyze (a receptor location) at each of these "hot spot" intersections was then specified in consultation with DEQE personnel. For the Massachusetts Avenue at Albany Street intersection, the receptor was sited at the corner of the Boston City Hospital. For the second intersection, the receptor was sited at the corner of the intersection of Melnea Cass Boulevard and the south leg of the Massachusetts Avenue approach to the Expressway ramp. Both receptors were located 3 meters from the curb of the roadway.

For each intersection, three scenarios were then analyzed:

- Existing baseline CO levels (1983).

FIGURE 6.3

STUDY LOCATIONS FOR TRAFFIC CO IMPACT

- Expected baseline CO levels in 1987, assuming the Facility is not built (1987 no-build).

- Projected CO levels in 1987, including the impact of Facility-related traffic (1987 build).

The baseline concentration at an intersection was determined as the sum of the urban background CO level plus the concentration impact of non-Facility-related traffic using the intersection. Background levels of CO in Boston for 1983 and 1987 were determined on the basis of background-trend data supplied by DEQE. Finally, in order to project CO levels to be expected once the Facility is in operation, the concentration impact of Facility-related traffic was added to the 1987 no-build baseline concentration.

To calculate the impact of baseline traffic levels in 1983 and 1987 and the impact of Facility-related traffic, mathematical models were applied. The EPA Mobile 2 model was used to quantify the CO emissions of vehicles using each intersection. The EPA Hiway-2 model was then used to calculate resulting CO concentrations at the nominal receptor location designated for each intersection. Data on intersection geometrics and on existing and future traffic volumes were obtained from the traffic engineering study prepared for the Facility (see Subsection 6.5). Additional information on the mix of cars and trucks was supplied by DEQE.

In Table 6.14, baseline CO levels calculated for 1983 (existing conditions) and for the 1987 no-build scenario are compared with the ambient standards for 1- and 8-hour averaging periods. The relative contributions of background and traffic emissions to the baseline concentrations are also shown. At both "hot spot" intersections, the 1983 and 1987 baseline concentrations will be less than the 1-hour CO standard; however, in 1983, the 8-hour CO standard is exceeded. By 1987, however, the analysis indicates that baseline concentrations (no-build) at these intersections will be within the air quality standards. Improvement in baseline air quality is, therefore, projected between 1983 and 1987. Although traffic volumes will increase during this period, traffic CO emissions will decrease. Reasons for emission reductions include:

- Increased fuel efficiency of new automobiles.

- Effective pollution control devices on new cars.

- The Massachusetts program of vehicle inspection and maintenance being implemented in 1983.

In Table 6.15, the 1987 CO levels are projected at the two intersections, with the impacts from Facility-related traffic included (1987 build scenario). These projections are based on the maximum hourly traffic volumes expected from Facility operations. From the information in Table 6.15, it is concluded that maximum

TABLE 6.14

BASELINE CO CONCENTRATIONS WITHOUT FACILITY (ug/m^3)

YEAR	AVERAGING PERIOD	AMBIENT STANDARD	CO CONCENTRATIONS					
			MASS AVE. AT ALBANY STREET			MASS AVE. AT SOUTHEAST EXPRESSWAY		
			Background	Baseline Traffic	Total Baseline	Background	Baseline Traffic	Total Baseline
1983	1-hour	40,000	4,322.0	11,114.0	15,436.0	4,322.0	15,076.0	19,398.0
	8-hour	10,000	2,299.0	7,780.0	10,079.0	2,299.0	10,553.2	12,852.2
1987	1-hour	40,000	3,230.0	7,098.0	10,328.0	3,230.0	10,321.0	13,551.0
	8-hour	10,000	2,299.0	4,969.0	7,268.0	2,299.0	7,225.0	9,524.0

TABLE 6.15

PROJECTED 1987 CO CONCENTRATIONS WITH FACILITY-RELATED TRAFFIC (ug/m^3)

MASSACHUSETTS AVENUE AT ALBANY STREET

Period	Ambient Standard	Background	Baseline Traffic	Total Baseline	Facility Traffic	Projected Air Quality
1-hour	40,000	3,230.0	7,098.0	10,328.0	1.0	10,329.0
8-hour	10,000	2,299.0	4,969.0	7,268.0	0.3	7,268.3

MASSACHUSETTS AVENUE AT SOUTHEAST EXPRESSWAY

Period	Ambient Standard	Background	Baseline Traffic	Total Baseline	Facility Traffic	Projected Air Quality
1-hour	40,000	3,230.0	10,321.0	13,551.0	219.0	13,770.0
8-hour	10,000	2,299.0	7,225.0	9,524.0	153.0	9,667.0

levels of traffic generated as a consequence of Facility operations will not result in violation of the ambient CO standards. The impact from Facility-related traffic is insignificant when compared with the impact from existing traffic.

In Table 6.16, the combined impact of CO emissions from the Facility stack and from Facility-related traffic is assessed at the "hot spot" intersections. No violation of the ambient standards is projected. The total impact of CO emissions from the Facility stack and from Facility-related traffic is shown to be negligible compared with baseline CO concentrations.

6.3.4.3.2 Regional Impacts. A study has been conducted to determine the impact of Facility operations on regional vehicular emissions of the ozone precursor pollutants -- NO_x and HC. The solid waste planned for disposal at the Facility beginning in 1987 is currently trucked to a number of landfills located in eastern Massachusetts, and even as far away as New Hampshire. Once the Facility commences operations, the miles travelled by the waste delivery trucks will be reduced relative to the current disposal practice. The net reduction in truck miles travelled after the Facility becomes operational is approximately 1,400,000 miles per year.

Given this decrease in annual truck miles, the attendant reductions in annual emissions of NO_x and HC have been estimated using standard EPA emission factors for diesel trucks. The reductions in regional

TABLE 6.16

PROJECTED 1987 CO CONCENTRATIONS INCLUDING FACILITY STACK AND TRAFFIC IMPACTS (ug/m^3)

MASSACHUSETTS AVENUE AND ALBANY STREET

Period	Ambient Standard	Baseline	Facility Traffic	Facility Stack	Projected Air Quality
1-hour	40,000	10,328.0	1.0	7	10,366
8-hour	10,000	7,268.0	0.3	4	7,272

MASSACHUSETTS AVENUE AT SOUTHEAST EXPRESSWAY

Period	Ambient Standard	Baseline	Facility Traffic	Facility Stack	Projected Air Quality
1-hour	40,000	13,551.0	219.0	7	13,777
8-hour	10,000	9,524.0	153.0	4	9,681

emissions loading for NO_x and HC were calculated to be 31 tons per year, and 7 tons per year, respectively. Supporting data, calculations, and the emission factors utilized for this regional impact analysis are included in Appendix H in Volume II of this EIR.

6.3.4.4 Fugitive Dust and Odors

Potential sources of fugitive dust during Facility operations include truck dumping when waste is delivered, the waste storage area, residue trucks, and roadway dust. Waste truck discharge and waste storage are also potential sources of odor.

As a result of specific mitigation measures, there will be no significant impacts from fugitive dust or odor sources. All waste handling activities, including waste delivery truck dumping and waste storage, will occur in enclosed structures rather than in the open. The waste storage pit and tipping area will be maintained at a slightly negative internal pressure so that dust and odors will not be released to the ambient air.

Primary combustion air for the furnace will be drawn from the waste storage pit air volume. Makeup air will be induced from the tipping area, so that dust, truck exhaust fumes, and solid waste odors will be swept into the furnace. As the air exhausted from the pit is drawn into the furnace, the odors are destroyed in the combustion

process. Secondary combustion air for the furnace will be collected from inside the boiler house.

Facility residue (ash) awaiting transport will be contained in an enclosed residue storage pit. The wet residue will be drained of excess water, but will be outloaded and transported moist. Residue trucks will be covered to prevent spillover and windblow, and truck beds will be sealed to prevent drippage.

Roads and areas of significant vehicular activity will be paved. All paved areas will be swept routinely to minimize accumulation of loose particulate on the pavements. Travelled segments exhibiting rapid dust accumulation will be watered, as appropriate. Controls will be imposed to restrict vehicle speeds on site roads.

6.3.4.5 Cooling Tower Impact

6.3.4.5.1 Approach. The Facility will be equipped with a wet/dry mechanical draft cooling tower. The cooling tower will be located approximately 100 feet west of the Facility stack, and 150 feet south of the Massachusetts Avenue access ramp that serves the Southeast Expressway (the nearest roadway). The tower is designed to produce no significant visible plume when operating in a wet mode at ambient temperatures as low as $-5^{o}F$.

The potential extent of visibility impairment (fogging) and roadway icing resulting from operation of the Facility cooling tower was evaluated in a wet mode. Results of the evaluation are summarized in this Subsection, and details of the analysis are provided in Appendix E in Volume II of this EIR. Icing on road surfaces can result from two conditions: deposition of the small water droplets (drift) that escape the cooling tower, and impaction of the visible plume on the road surfaces. The vapor plume emitted by the cooling tower will become visible (condense) when the water vapor in the plume and the ambient water vapor combine to cause saturation of the air in the plume. As the ambient temperature decreases, the amount of additional water vapor the atmosphere can hold before saturation and condensation occur also decreases. Therefore, the maximum occurrence of visible plume would be expected to occur during periods when the background (ambient) moisture content is high and the temperatures are low.

Two models were used to estimate the potential extent of surface icing and visibility impairment caused by wet mode operation of the proposed cooling tower.

A drift deposition model, described in Appendix E in Volume II of this EIR, calculates the amount of water-droplet drift that is deposited on the ground as a function of various meteorological conditions. The model is also able to estimate the amount of drift deposited on elevated roadway surfaces (e.g., the elevated Southeast

Expressway and its ramps adjacent to the Facility site). The model assumes conservatively that the droplets do not evaporate after they leave the plume.

A cooling tower plume model, also described in Appendix E, was used to calculate the moisture content of the plume and the ambient air, and to then determine if the plume is visible at specified locations and elevations. Icing is assumed to occur if the plume is visible when the ambient temperature is at or below 32^{o}F. The model simulates building-downwash of the cooling tower plume. Inclusion of this condition in the model is essential because it is the primary means by which a visible plume can reach the ground.

Cooling tower operational data used in the impact modeling is presented in Table 6.17. The tower is designed to prevent 99.996 percent of the drift droplets from escaping the cooling tower. This elimination efficiency is consistent with modern cooling tower design practices.

Five years of surface meteorological data (1977-1981) measured at Boston's Logan Airport were evaluated for use in the cooling tower modeling. Data for 1979 were selected because this was the year with the maximum joint frequency of occurrence of winds from the south-southeast and temperatures below freezing, which are conditions that could result in deposition of droplets and impaction of visible plume on the service ramps to the Southeast Expressway.

TABLE 6.17

COOLING TOWER OPERATING DATA

PARAMETER	DESIGN VALUE
Type	Mechanical Draft Induced Cross-Flow
Dimensions (m)	
• Length	36.8
• Width	16.1
• Height	12.6
• Diameter (per cell)	7.3
• Number of cells	3
Cooling water recirculation rate (gpm)	24,200
Evaporative water loss (gpm)	600 (summer peak)
Drift elimination efficiency (%)	99.996
Design wet bulb temperature (^{o}F)	72 (summer)
Design dry bulb temperature (^{o}F)	25 (winter)
Vapor plume exit velocity (m/s, per cell)	7.64 (full fan speed)
Vapor plume exit temperature (^{o}F, dry bulb)	99.7 (full fan speed)

6.3.4.5.2 Potential for Ground-Level Icing from Drift Deposition. The maximum deposition rate calculated anywhere on the Southeast Expressway and on the local ramps servicing the Southeast Expressway is 0.0014 ug/m^3 per second. The model predicts this to occur on the service ramp, with a wind from the southeast and wind speed of 10 miles per hour. This combination of wind speed/wind direction occurred only 4 (unconsecutive) hours in 1979. If the wind direction and speed were to persist for 1 hour, a total of only 2 one-thousandths of an inch of ice would accumulate, and this value does not include the countering effect of evaporation. The results of this conservative analysis, therefore, indicate that droplet drift from the cooling tower presents no potential for significant ice accumulation on the Southeast Expressway, its local service ramps, and other local roads.

6.3.4.5.3 Potential for Fogging and Ground-Level Icing from Visible Plumes. The frequencies of visible-plume-induced icing and fogging were estimated for both surface-level and elevated roadways near the site. Plume-induced means those hours when fogging or icing would not have occurred naturally.

The plume emitted from the cooling tower is not predicted by the model to impact the Southeast Expressway or its service ramps during periods when the ambient temperature is $32^{o}F$ or less; therefore, icing is not anticipated on these roadways as a result of the visible plume. Groundlevel icing from the visible plume is predicted to

occur, however, in areas located south of the cooling tower. The off-site location with the maximum frequency of occurrence of ground-level icing is the area between Atkinson and Topeka Streets, adjacent to the Facility site. Only 3 hours per year of icing from the visible plume are indicated there, however, and this is less than the frequency of icing from natural ice storms (5 hours per year). The cooling tower will be operated in the dry mode or in the combined wet-dry mode as needed to eliminate any possibility of groundlevel icing.

Operation of the proposed cooling tower in the wet mode is predicted to result in instances of visible plume impact on the local Southeast Expressway ramps when the temperature is 32°F or greater. The plume is not predicted to be visible on the Southeast Expressway, however. The highest incidence of fogging (winter season) is predicted to occur on the service ramp located 230 feet north-northeast of the proposed cooling tower. The highest frequency of surface fog expected on the Southeast Expressway ramps is 85 hours per year, occurring in the winter. The occurrence of natural fog is 45 hours per year. The cooling tower will be operated in the dry mode or in the combined wet-dry mode whenever necessary to preclude plume-induced fogging on the local roadways.

Finally, the potential for elevated visible plumes from the cooling tower interfering with airplanes and helicopters that fly in the general area was considered. The modeling indicated that visible

plumes from the cooling tower will rise to heights between 700 and 1,000 feet above the ground 46 hours per year. Therefore, a visible plume above 1,000 feet would be expected less than 46 hours per year. Further, the model indicated that visible plumes at this level would never extend beyond about 0.5 miles from the Facility, precluding any possible interference with aircraft at Logan Airport, located about 3 miles away. Aircraft, including helicopters, flying directly over the Facility will experience no significant interference from the cooling tower plume, given the small size of the plume, and the rarity of visible plumes at elevations above 700 feet.

6.4 NOISE

6.4.1 REGULATORY REQUIREMENTS

There are no federal regulations that apply to community noise resulting from this project. DEQE, however, has established acceptability criteria for assessing the noise impact of new facilities, and a City noise regulation applies that limits the maximum noise levels permitted from construction and operation of the Facility.

6.4.2 SOURCES OF NOISE AND MITIGATION

With the exception of vehicle-related noise, operational noise from the Facility will be continuous in nature. The primary sources of continuous noise within the Facility are fans, the cooling tower, turbine-generator operations, and boiler building operations. Other, less-significant sources of noise include transformers, precipitator rappers, and waste delivery truck unloading. The Facility will incorporate a number of noise abatement measures that will ensure compliance with the DEQE and City noise regulations. These noise mitigation measures include:

- Silencers on fans.
- Confinement of waste delivery truck unloading to an enclosed tipping hall.
- Procurement of low noise emission equipment.
- Isolation of particular noise sources.
- Placement of sound barriers at strategic locations.
- Selection of building wall and roofing materials having effective sound-absorption properties.

- Installation of silencers on power-operated and safety relief valves.

Truck traffic generated by operation of the Facility will impact noise levels on an intermittent basis. Facility-generated truck traffic, however, will represent only a small fractional increase over the current substantial traffic volumes in the site area, and the associated increase in noise will be insignificant (less than 1 dBA) along access routes used by Facility trucks. To control noise from trucks delivering waste to the Facility, it is recommended that regulatory requirements for exhaust mufflers be enforced. The trailer trucks that haul Facility residue (ash) away will access the site using the Southeast Expressway and will not utilize local residential streets. Arrivals of both waste delivery trucks and residue trucks will be confined to normal daily hours of commerce.

6.4.3 IMPACTS

An engineering study was conducted to assess the noise impact from Facility operations. The study determined that the noise from Facility operations will essentially be inaudible at the nearby hospitals and residences, because Facility-related noise would be masked by the high background noise level that exists in the area. The study also determined that operational noise levels will not exceed DEQE and City noise standards. Specific study findings are

summarized below, and the engineering report is provided as Appendix I in Volume II of this EIR.

The noise environment in 1987, assuming an operating Facility, has been compared with both 1983 baseline noise levels (existing conditions) and with 1987 baseline noise levels (no-build scenario).

During October 1983, noise measurements were made to establish baseline noise levels at the site fence line and at the closest noise-sensitive locations in the surrounding community. The closest noise-sensitive locations are:

- City-University Hospitals complex (1,350 feet west of site).
- South End residential (1,400 feet northwest of site).
- South Boston residential (2,550 feet southeast of site).

Existing noise levels, both background and intrusive noise, were measured on days of the week and during times of the day corresponding to maximum and minimum noise-producing activity. As summarized in Table 6.18, the measured background noise level ranged from a maximum of 62 dBA, which occurred on a weekday morning, to a minimum of 44 dBA, which occurred early on a Sunday morning. The

TABLE 6.18

BASELINE AND FUTURE PREDICTED OPERATIONAL NOISE LEVELS

NOISE LEVEL CONDITION	BACKGROUND (L_{90}) AND INTRUSIVE (L_{10}) NOISE LEVELS (dBA)					
	City-University Hospital		South End		South Boston	
	L_{90}	L_{10}	L_{90}	L_{10}	L_{90}	L_{10}
Baseline[a]						
• Minimum	49	56	47	51	44	49
• Maximum	62	68	59	69	56	64
Future (Facility Operation)						
• Minimum[b]	54	57	52	54	46	50
• Increase	5	1	5	3	2	1
• Maximum[b]	62	68	60	69	56	64
• Increase	0	0	1	0	0	0
• Facility only[c]	51	51	50	50	42	42

a. Based upon noise measurements.

b. Future noise levels representing effect of Facility plus baseline noise.

c. Facility noise only (exclusive of baseline).

intrusive noise levels ranged from a maximum of 69 dBA to a minimum of 49 dBA. The major existing source of noise affecting these areas is traffic on the Southeast Expressway and on local streets. Existing weekday noise levels place these residential locations in the "noisy" to "very noisy" categories of the EPA scale (EPA, 1971) for describing noise levels in urban residential areas.

A mathematical model of noise propagation, ERTNOI, has been used to predict the noise impact of Facility operations at the sensitive community locations. Maximum Facility impacts are presented in Table 6.18 for comparison with 1983 and 1987 baseline noise levels. In defining baseline noise levels, the existing noise levels shown in Table 6.18 can serve as both the 1983 and the 1987 baseline values, because, while existing noise levels are predicted to increase due to traffic increases, this increase will be insignificant (less than 1 dBA) in 1987.

From Table 6.18, it is apparent that the maximum noise levels predicted to occur as a result of Facility operations will be smaller in magnitude than the 1983 and 1987 baseline noise levels, except during those periods when the background noise is at an absolute minimum. This means that operational noise from the Facility will be unnoticeable at the noise-sensitive community locations, except during especially quiet periods. At such times (e.g., early Sunday mornings), Facility operations might be barely audible to some people, and only if those individuals were outdoors.

With respect to the Boston noise regulations, the land uses in the vicinity of the site are mixed residential, commercial, and industrial, so that the applicable upper limits on noise from the Facility are 65 dBA daytime and 55 dBA at other times. Predicted noise from the Facility, based upon a conservative representation of the noise analysis results, is a maximum noise level component of 51 dBA at the closest noise-sensitive location. This complies with the City regulation.

The noise from the Facility is also expected to be in compliance with DEQE criteria. That is, the maximum increase in broadband noise is expected to be 5 dBA, well within the allowable increase of 10 dBA. Production of a "pure tone condition" is not expected, because of the noise abatement features being designed into the Facility.

In summary, because of noise-mitigation measures being designed into the Facility and noise attenuation with separation distance, the noise levels produced by the Facility at the nearest noise-sensitive locations (hospitals and residences) will be generally equal to or less than existing noise levels. High background noise levels from the Southeast Expressway and from the commercial zone that exists between the Facility site and the noise-sensitive locations effectively mask Facility-related noise. DEQE and City noise standards will not be exceeded due to operation of the Facility.

6.5 TRAFFIC/TRANSPORTATION

An engineering study was conducted to determine the impact of Facility operations on traffic volumes and flow, both in the immediate vicinity of the Facility, and on a regional basis. The study and its findings are summarized in this Subsection, and the full engineering report is included as Appendix J in Volume II of this EIR.

6.5.1 LOCAL TRAFFIC IMPACTS

6.5.1.1 Existing and Future Traffic Volumes

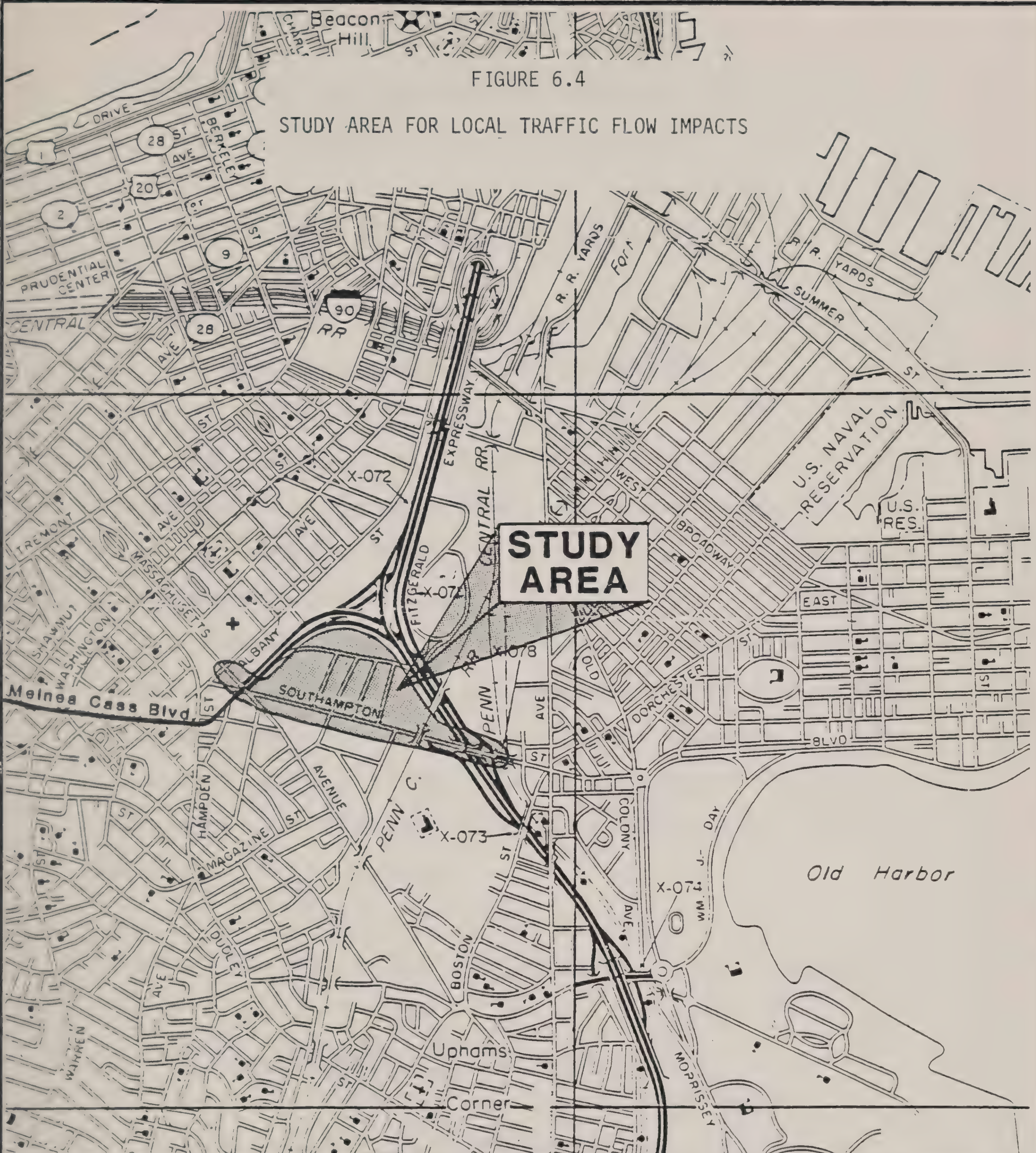
As a result of Facility operations, additional traffic will converge on the site area. This traffic will comprise waste delivery trucks, residue trucks, and employee vehicles. A study has been conducted to characterize existing and future traffic conditions in the site area. The local study area is depicted in Figure 6.4.

The study entailed four steps:

- Describe the 1983 baseline transportation environment (existing scenario).

FIGURE 6.4

STUDY AREA FOR LOCAL TRAFFIC FLOW IMPACTS



Boston Waste To Energy Project

- Project the 1987 baseline traffic conditions if the Facility is not built (1987 no-build scenario).

- Estimate impact from Facility-generated traffic.

- Project traffic conditions in 1987, assuming the Facility is in operation (1987 build scenario).

The most significant impacts are expected to occur in the area bounded by the Albany Street/Massachusetts Avenue intersection on the west, by South Bay Avenue on the south, and by the Southeast Expressway overpass on the east. In October 1983, a field study was conducted to document existing transportation conditions in the area. Data inventoried included daily and peak hour traffic flow patterns, traffic volumes, vehicle speeds and roadway geometrics. Traffic flows were measured through placement of mechanical recorders at selected locations as well as by manual observations of turning movements at all key locations.

There are four major intersections located in the local study area:

- Massachusetts Avenue at Albany Street. This is a four-way intersection controlled by three-phase traffic signal operation. Traffic flow is separated by a median island on all intersection legs, except for Albany Street on the north.

- Massachusetts Avenue/Southampton Street at Melnea Cass Boulevard/Southeast Expressway ramps. This is a four-way intersection controlled by a four-phase traffic signal control with exclusive left turns from all approaches moving unopposed. Median islands separate traffic flow on all four intersection legs.

- Southampton Street at Topeka Street/Glynn Way. This is a four-way unsignalized intersection with Glynn Way one-way into the intersection (northbound) and Southampton Street (the western leg) one-way out of the intersection. Southampton Street, east of the intersection is two-way. A traffic island in the middle of this intersection forces vehicles entering Topeka Street from Glynn Way to slow down. This island also makes the left-turn from Topeka Street to Southampton Street awkward, particularly for trucks.

- Southampton Street at Southeast Expressway Ramps. This intersection forms two unsignalized intersections; a "Y" type intersection at the on-ramp to the Expressway southbound, and a four-way intersection at the northbound on-ramp and off-ramp.

Based on the mechanical recorder counts, existing (1983) average daily traffic volumes for key roadways within the study area are

depicted in Figure 6.5. Volumes along Southampton Street in proximity to the site are approximately 15,400 vehicles per day. The Southeast Expressway on and off ramps carry about 19,000 vehicles per day and 20,600 vehicles per day, respectively. On Topeka Street, average two-way daily traffic is approximately 400 vehicles per day. The maximum hourly traffic volume on Southampton Street was found to occur from 7:00 a.m. to 8:00 a.m. weekdays.

To analyze the potential traffic impacts of the Facility, it was necessary to estimate the amount of traffic that would be generated during Facility operations. In this case, the number of Facility-generated trips was determined by interviewing City and private operators of the trucks currently utilized and planned for waste delivery and for disposal of residue ash. In Table 6.19, the volume of additional traffic is shown on a daily basis, and also for the peak hours (9:00 to 10:00 a.m. and 1:00 to 2:00 p.m.) of Facility-generated traffic. The volume of Facility-generated traffic is summarized by vehicle type.

For peak hour of Facility-generated traffic (1:00 to 2:00 p.m.), a detailed analysis of existing and projected traffic volumes was carried out for each of the four major intersections described above. This peak hour was chosen for analysis because the cumulative background and Facility peak-hour traffic volumes are higher for 1:00 to 2:00 p.m. than for the other Facility peak hour of 9:00 to 10:00 a.m. The 1983 baseline traffic volumes currently using each

FIGURE 6.5

EXISTING DAILY TRAFFIC LEVELS

Boston Waste To Energy Project

Existing Average Daily Traffic (ADT)

Vanasse/Hangen Associates
Boston, MA

0 1000 2000
Scale in Feet

TABLE 6.19

SITE-GENERATED VEHICLE SUMMARY: ARRIVALS

SOURCE	PEAK HOURS (9-10 a.m.; 1-2 p.m.)	OFF-PEAK	DAILY[b]
	Refuse Trucks (Conventional Packers)		
City of Boston	40/hour	27 total	107 total
BFI (commercial)	9	54	72
Other Cities (Cambridge, Brookline, Quincy & Waltham)	17	9	43
	Residue Trucks (Heavy-Duty Trailer Trucks)		
	6/hour	12	24
	Employee Arrivals (Automobiles)		
	a	27	27
TOTAL ARRIVALS	72/hour	129 total	273 total

a. No employee trips will occur during the hours of peak Facility-generated traffic.

b. Daily vehicle trips include two times the peak-hour traffic plus the off-peak traffic.

intersection are shown in Table 6.20, and were determined from data collected during the field measurements study. Table 6.20 also shows the truck component of the existing traffic levels. High volumes of traffic currently utilize these intersections, and 25 percent of the traffic is trucks.

Next, the 1987 baseline (no-build) traffic levels were projected. Except for the Facility, there are no traffic-generating projects planned for the study area. A moderate traffic growth rate of 1.5 percent per year was assumed, therefore, in projecting 1987 baseline conditions from the 1983 baseline traffic levels. The projected 1987 baseline (no-build) traffic levels are also shown in Table 6.20, reflecting the expected 1.5-percent annual growth.

The additional truck traffic expected to utilize each intersection as a result of Facility operations is summarized in Table 6.20. Anticipated truck routing and peak-hour volumes for these intersections were determined on the basis of the discussions with City and private waste collectors. Finally, the projected total traffic utilizations for each intersection for the 1987 build scenario was determined by summing the 1987 baseline traffic levels and the Facility-generated traffic. Projected 1987 traffic levels under the build scenario are shown in Table 6.20. From this table, it is apparent that peak Facility-generated traffic will cause only minor increases in traffic levels at these four key intersections. The greatest impact is at the intersection of Southampton and Topeka

TABLE 6.20

EXISTING AND PROJECTED TRAFFIC VOLUMES AT LOCAL INTERSECTIONS FOR THE STUDY PEAK HOUR (1-2 p.m.) OF FACILITY-GENERATED TRAFFIC

INTERSECTION	SCENARIO	NUMBER OF VEHICLES USING THE INTERSECTION			
		Total	Cars	Trucks	Percent Trucks
Massachusetts Avenue/ Albany Street	1983 Existing Baseline	2,366	2,115	251	11
	1987 No-Build Baseline	2,513	2,237	276	11
	Facility-Generated Vehicles	10	0[a]	10	--
	1987 Build (Baseline & Facility)	2,523	2,237	286	11
Massachusetts Avenue/ Southampton Street/ Melnea Cass Boulevard	1983 Existing Baseline	3,502	2,669	833	24
	1987 No-Build Baseline	3,718	2,826	892	24
	Facility-Generated Vehicles	91	0[a]	91	--
	1987 Build (Baseline & Facility)	3,809	2,826	983	26
Southampton Street/ Topeka Street/Glynn Way	1983 Existing Baseline	1,606	1,222	384	24
	1987 No-Build Baseline	1,704	1,295	409	24
	Facility-Generated Vehicles	149	0[a]	149	--
	1987 Build (Baseline & Facility)	1,853	1,295	558	30
Southampton Street/ Southeast Expressway Overpass	1983 Existing Baseline	1,256	809	447	36
	1987 No-Build Baseline	1,334	854	480	36
	Facility-Generated Vehicles	20	0[a]	20	--
	1987 Build (Baseline & Facility)	1,354	854	500	37

a. Facility operations generate automobile traffic as a result of employee commuting, but not between 1:00 p.m. to 2:00 p.m..

Streets. Even so, the Facility-generated traffic using this intersection would increase 1987 baseline traffic levels by only 9 percent, and increase the percentage of trucks only slightly (24 to 30 percent).

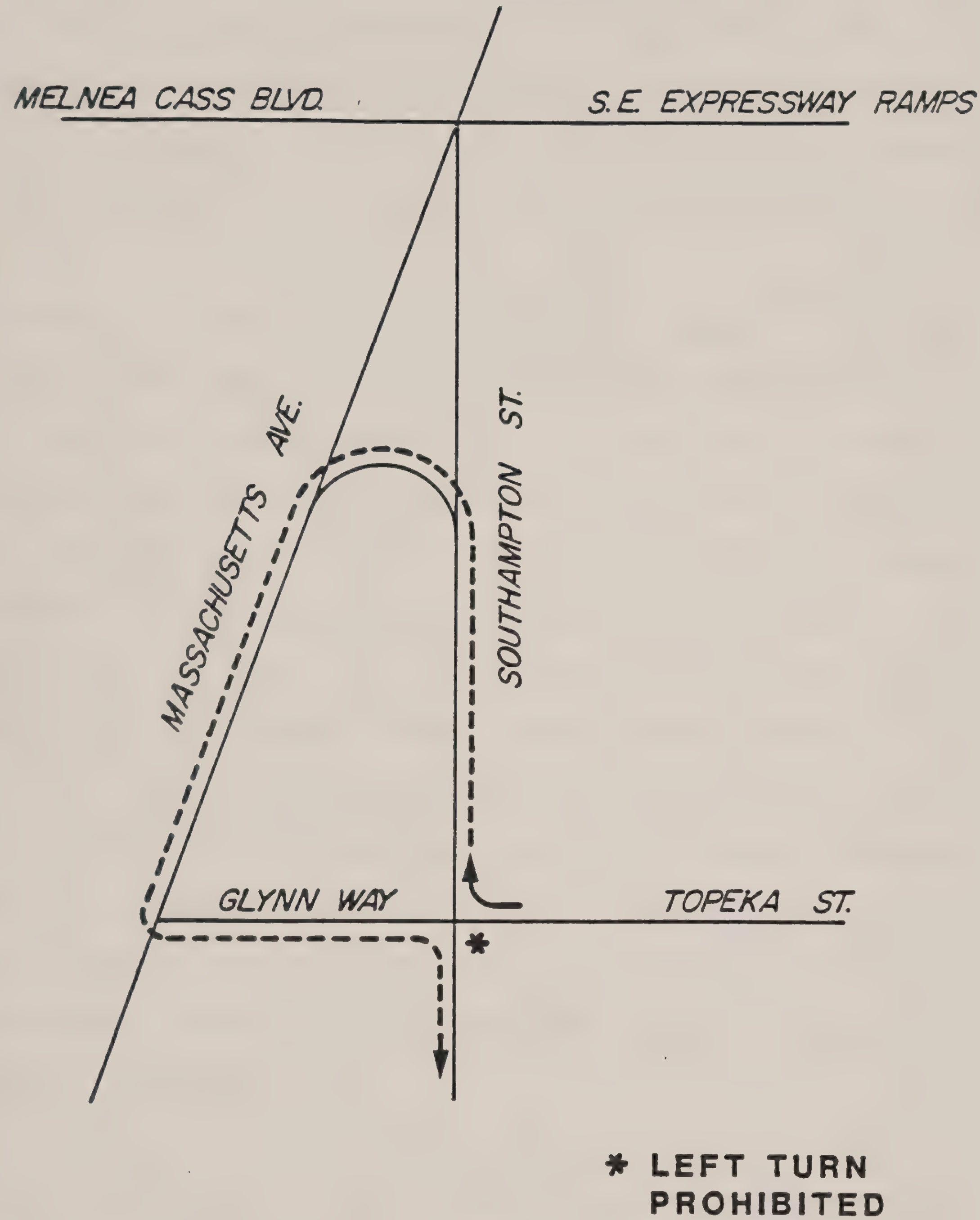
While no significant traffic impacts at the intersections are anticipated from Facility operations, the left turn from Topeka Street to Southampton Street will be prohibited because the existing traffic island makes this an awkward maneuver, especially for trucks. Because of the increase of about 140 daily truck movements at this intersection by 1987 if the Facility is built and the relatively narrow pavement width available on Topeka Street, prohibiting the left turn is necessary to ensure optimum traffic flow and safety. Traffic will be rerouted as shown in Figure 6.6, and the preceding analysis has assumed this change.

6.5.1.2 Quality of Traffic Flow

The quality of traffic flow through the key intersections has also been assessed for existing and future conditions. Levels of service (LOS) is a term that defines the operating condition occurring on a roadway or at an intersection when accommodating various levels of traffic volumes. This is a qualitative measure reflecting a number of operational factors such as traffic speed, travel delay, maneuverability and safety. In applying these LOS to a roadway or an

FIGURE 6.6

TOPEKA STREET RECIRCULATION



Boston Waste To Energy Project	Recommended Topeka St. Recirculation	Vanasse/Hangen Associates Boston, MA Not to Scale

intersection, it is possible to index the operational qualities of the roadway section being studied. LOS categories are defined in Table 6.21 in terms of expected traffic delay, and in terms of a roadway's capacity to accept additional vehicles per hour. In practice, any roadway may operate at a wide range of LOS, depending on the time of day, day of week, or period of year.

Efficiency of vehicular movement on urban roadways is directly affected by the capabilities and adequacy of associated intersections and connecting road segments. For relatively short lengths of roadway between intersecting streets (as is the case for this study area), the intersections control the LOS provided by the roadways. Therefore, the four major intersections in the site area have been analyzed for this study. For an intersection, LOS C represents a stable flow, with occasional backups behind turning vehicles. In the case of a signalized intersection at LOS C, a driver may, on occasion, have to wait through more than one red signal indication. Intersection capacity is reached at LOS E and is characterized by long backups or queues of vehicles waiting to pass through the intersection. Delays are often substantial and may be more than one signal cycle in length.

The quality of traffic flow at each of the four intersections has been assessed for 1983 baseline conditions; 1987 baseline (no-build) conditions; and for 1987 assuming the Facility is operational (1987 build). Results are summarized in Table 6.22. The information in

TABLE 6.21

LOS AND EXPECTED DELAY FOR HOURLY RESERVE CAPACITY RANGES

LOS	RESERVE CAPACITY	EXPECTED TRAFFIC DELAY
A	>400 vehicles	Little or no delay
B	400 to 399	Short traffic delays
C	200 to 299	Average traffic delays
D	100 to 199	Long traffic delays
E	0 to 99	Very long traffic delays
E	Less than 0	Failure (extreme congestion)
F	(Any Value)	Intersection blocked by external causes

TABLE 6.22

INTERSECTION LOS FOR HOUR WITH STUDY PEAK-HOUR FACILITY TRAFFIC (1-2 p.m.)

INTERSECTION	LOS		
	1983 Baseline (Existing)	1987 Baseline (No-Build)	1987 Projected (Build)
Massachusetts Ave/Albany Street[a]	A	A	A
Massachusetts Avenue and Southampton Street/Melnea Cass Boulevard and Expressway Ramps[a]	C	D	D
Southampton Street at Topeka Street and Glynn Way[b]			
• Glynn Way NB[c] Left	A	A	B
• Topeka Street Exiting Traffic	B	B	A
Southampton Street at Expressway Overpass[b]			
• Southbound Ramp Exit to Southampton Street	B	B	B
• Southampton Street Left to SB[d] Ramp	B	B	B
• Northbound Exit Ramp Left to Southampton Street	C	C	C
• Northbound Exit Ramp Right to Southampton Street	A	A	A
• Northbound Entrance Ramp Amtrak Exit to Southampton Street	A	A	A
• Southampton Street Left to NB Entrance Ramp	B	B	B

a. Signalized intersection.
b. Unsignalized intersection.
c. NB = Northbound.
d. SB = Southbound.

Table 6.22 indicates that from 1983 to 1987, no significant change in the quality of peak hour traffic operations is expected at the following three of the four key intersections under either the 1987 no-build or build conditions:

- Massachusetts Avenue/Albany Street

- Southhampton Street/Topeka Street

- Southhampton Street/Southeast Expressway overpass.

At these three intersections, the LOS will range from LOS A to LOS C. LOS C is considered desirable peak-hour traffic flow. At the Southampton Street intersection with Topeka Street and Glynn Way, a slight change is noted from the 1987 no-build to the 1987 build conditions. Under the no-build condition, the Glynn Way and Topeka Street existing moves are at LOS A and B, respectively. Under the build condition, the LOS categories are reversed because, as previously discussed, the left turn from Topeka Street is assumed to be prohibited in 1987. This change upgrades the Topeka Street operations, but slightly degrades the Glynn Way operations because more vehicles are rerouted to that approach.

At the fourth intersection, Massachusetts Avenue and Southampton Street with Melnea Cass Boulevard and the Expressway Ramps, LOS drops from C in 1983 to D in 1987. However, this LOS drop is projected to

occur by 1987 whether or not the Facility is built. LOS D is generally considered acceptable for peak-hour periods in urban areas.

The closing of South Bay Avenue (which will be part of the Facility site) east and west of the Facility will not have any effect on local through traffic because this road is not currently used by through traffic. The only traffic currently using South Bay Avenue is traffic associated with visitors to and employees of the nonretail commercial activities adjacent to the site on Moore Drive, Cummings Drive, Topeka Street, Atkinson Street, and Bradston Street. Each of these roads currently carries less than 500 vehicles per day. Therefore, the distribution of the South Bay Avenue traffic to these side streets will not cause any significant impacts.

6.5.2 REGIONAL TRAFFIC IMPACTS

Based on interviews with City and private waste collectors, information has been obtained to enable a comparison of existing routing of trucks to landfill disposal sites with the anticipated routes for disposal at the Facility. Existing and proposed routings of waste collection trucks serving Boston, Cambridge, Brookline, Quincy, and Waltham are described in Table 6.23 and illustrated in Figure 6.7. Existing and anticipated truck volumes on each route are also given in Table 6.23.

TABLE 6.23

EXISTING AND PROPOSED WASTE TRUCK ROUTES

SOURCE	EXISTING ROUTE	NO. OF WASTE TRUCKS (per day)	PROPOSED ROUTE	NO. OF WASTE TRUCKS (per day)
CITY OF BOSTON				
AREA 1				
• District 1A (Charlestown)	- Gilmore Bridge to Somerville Transfer Station to Saugus or Rochester, NH landfills	6	- Charlestown Bridge to Expressway SB[a] to Massachusetts Avenue	6
• District 1B (Boston Proper)	- Expressway NB[b] to Saugus landfill	21	- Expressway SB to Massachusetts Avenue	21
• District 9 (East Boston)	- Expressway NB to Saugus landfill	4	- Sumner Tunnel to Expressway SB to Massachusetts Avenue	4
• District 10 (Roxbury)	- Massachusetts Avenue or Expressway NB to Somerville Transfer Station to Saugus or Rochester, NH landfills	10	- Blue Hill Avenue to Magazine Street to Massachusetts Avenue	4
			- Dudley Street to Harrison Avenue to Melnea Cass Blvd.	3
			- Tremont Street to Melnea Cass Blvd.	3
AREA 2				
• District 2 (Jamaica Plain)	- Route 128 to Plainville landfill	6	- Washington Street to Massachusetts Avenue	3
			- Centre Street to Melnea Cass Blvd.	3
• District 4 (Brighton)	- Washington Street or Centre Street to Route 1 SB to Dedham Transfer Station to East Bridgewater or Plainville landfill	12	- Commonwealth Avenue to Massachusetts Avenue	4
			- No. Beacon Street to Commonwealth Avenue to Massachusetts Avenue	4
			- Mass. Turnpike to Expressway SB to Massachusetts Avenue	4
• District 6 (West Roxbury)	- Washington Street or Centre Street to Route 1 SB to Dedham Transfer Station to East Bridgewater or Plainville landfill	12	- Washington Street to Massachusetts Avenue	6
			- Centre Street to Melnea Cass Blvd.	6
• District 8 (Hyde Park)	- Hyde Park Avenue to American Legion Hgwy. to Blue Hill Avenue to Magazine Street to SCA Transfer Station in Roxbury to Amesbury or Plainville landfill	6	- Hyde Park Avenue to American Legion Hgwy. to Blue Hill Avenue to Magazine Street to Melnea Cass Blvd.	6

a. SB = Southbound.

b. NB = Northbound.

TABLE 6.23 (continued)

SOURCE	EXISTING ROUTE REFUSE TRUCKS (per day)	NO. OF WASTE TRUCKS (per day)	PROPOSED ROUTE	NO. OF WASTE TRUCKS (per day)
CITY OF BOSTON (Continued)				
AREA 3				
• District 3 (Dorchester No.)	- Blue Hill Avenue to Columbia Road to Massachusetts Avenue to SCA Transfer Station in Roxbury to Amesbury or Plainville landfills	12	- Blue Hill Avenue to Columbia Road to Massachusetts Avenue	12
• District 5 (So. Boston)	- Dorchester Street to Andrew Square to Southampton Street to SCA Transfer Station in Roxbury to Amesbury or Plainville landfills	6	- Dorchester Street to Andrew Square to Southampton Street	6
• District 7 (Dorchester So.)	- Blue Hill Avenue to Magazine Street to Massachusetts Avenue to SCA Transfer Station in Roxbury to Amesbury or Plainville landfills	12	- Blue Hill Avenue to Magazine Street to Massachusetts Avenue	12
CITY OF CAMBRIDGE	- Within Cambridge BFI Transfer Station, Cambridge to Plainville or Halifax landfills	14	- Expressway SB to Massachusetts Avenue	14
TOWN OF BROOKLINE	- Melnea Cass Blvd. SCA Transfer Station, Roxbury to Amesbury or Plainville landfills	8	- Melnea Cass Blvd.	8
CITY OF QUINCY	- Quincy Landfill	10	- Expressway NB to Southampton Street	10
CITY OF WALTHAM	- To Newton and Waltham Transfer Stations, then north to Amesbury landfill	11	- Mass. Turnpike to Expressway SB to Massachusetts Avenue	11
BFI (Commercial)	- To Cambridge BFI Transfer Station to Plainville or Halifax landfills	72	- Expressway SB to Massachusetts Avenue - Expressway NB to Southampton Street - Melnea Cass Blvd. to Massachusetts Avenue (local)	27 27 18

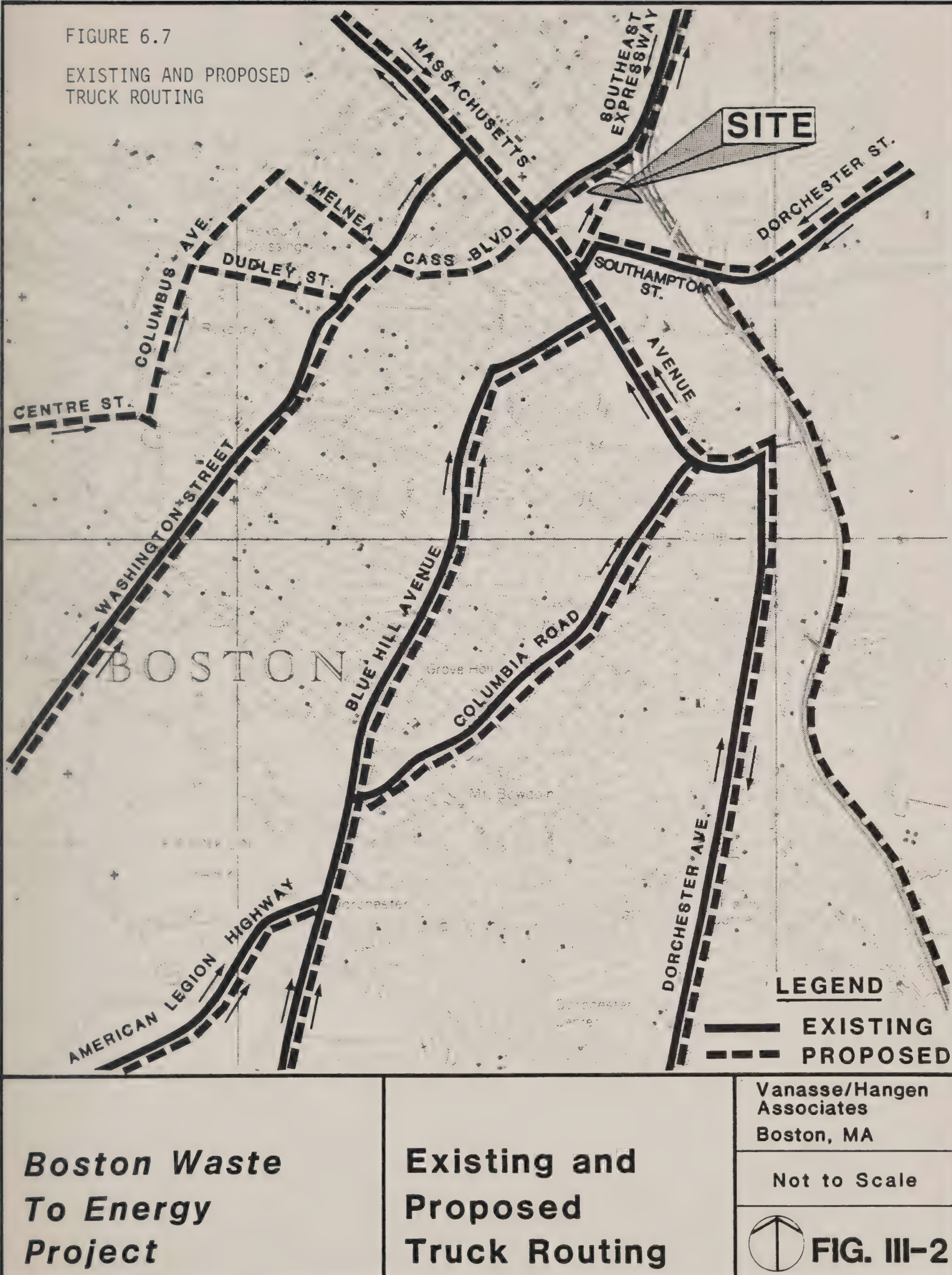


FIGURE 6.7

EXISTING AND PROPOSED TRUCK ROUTING

Little change from existing regional truck routes and volumes is indicated as a result of the Facility becoming operational. One exception is the addition of a route that will service West Roxbury from Centre Street, and then from either Columbus Avenue or Dudley Street to Melnea Cass Boulevard. Given that waste collection trucks currently serve these streets, the increase in trucks because of Facility operations will be unnoticeable. During the peak Facility traffic hour used in this analysis, there will be a maximum of two trucks per hour on Centre Street, three on Columbus Avenue, and one on Dudley Street. Melnea Cass Boulevard will experience an increase of 11 trucks in the peak hour, but this should not be noticeable because this road currently experiences heavy truck traffic.

Two other routes will also experience a small increase in peak-hour traffic. Southampton Street will carry 10 additional waste collection trucks and 6 residue trucks. An additional 23 waste collection trucks and 6 residue trucks will travel on the Southeast Expressway, north of the site. Neither of these two routes traverses residential areas. In addition, the small increase in truck traffic because of Facility-related traffic will be insignificant as these roads currently carry heavy traffic volumes that include a high percentage of truck traffic.

6.6 AESTHETICS

The Facility will be recognizable as a solid waste incinerator; however, its modern architecture will represent a definite aesthetic improvement over the existing incinerator facility. The architectural design of the Facility will be contemporary, embodying current design for industrial buildings. The various building units of different sizes and heights are grouped to form one compact structure. The highest building unit, the boiler house, is near the center of the structure and is flanked on each side by lower building units. The Facility will have a similar appearance when viewed from the Massachusetts Turnpike, skyway, local highways, and railroads that surround the site. Landscaping of the site will include trees, shrubs, and other vegetation, providing an aesthetic improvement over the current condition of the grounds.

REFERENCES

1. EPA, 1978. Guidelines for Air Quality Maintenance Planning and Analysis. Vol. 9 (Revised). Evaluating Indirect Sources. U.S. Environmental Protection Agency, Research Triangle Park, NC, September 1978.

7. ENVIRONMENTAL IMPACTS DURING CONSTRUCTION AND THEIR MITIGATION

In this Section, potential short-term environmental impacts during the construction period and planned mitigation measures are discussed for fugitive dust emissions, soil erosion, construction traffic, and construction noise. Construction debris will be disposed of at the Claypit Demolition Landfill in Marshfield, Massachusetts.

7.1 FUGITIVE DUST

Measures will taken be to control fugitive dust during construction. Effective dust control in the construction area will be provided by the application of water. In addition, all trucks will be covered during transportation to prevent dust blowing.

Prior to initiating the demolition of the existing incinerator, an investigation will be made to determine if the incinerator contains any asbestos materials. Given the age of the incinerator, such material may have been used in its construction for pipe insulation and boiler lagging. If asbestos is found, OSHA regulation CFR

1910.1001 concerning the use, handling, and disposal of asbestos materials will be strictly complied with. Measures to be adopted if necessary will include: use of respiratory equipment and special protective clothing; wetting down the work area to minimize airborne asbestos fibers; and good housekeeping practices. In addition, asbestos materials will be sealed in impermeable bags or other impermeable containers, and disposed of in a designated approved landfill.

7.2 SOIL EROSION

Because the site is essentially level, no appreciable soil erosion is expected as a result of stormwater runoff during construction. Standard erosion mitigation measures will be adopted during the construction period, consistent with local construction codes. Mulching and seeding will occur as soon as is practical.

7.3 TRAFFIC

During construction, vehicular traffic will increase in the vicinity of the site as a result of: construction workers commuting to and from the site; construction material deliveries; and construction waste removal for disposal.

Local public streets will provide adequate parking for construction workers' vehicles. Construction-related vehicular traffic is expected to peak in 1986, when approximately 375 construction workers will be required at the site. However, this traffic will occur before the normal morning and evening commuter peaks, and will easily be accommodated by the reserve capacity along the study area network.

APCI/BFI estimates that maximum construction-generated traffic will be eight truck arrivals per hour. Based on the traffic engineering study described in Subsection 6.5 of this EIR, the average traffic levels existing (1983) on major arteries in the immediate vicinity of the site are:

ROADWAY	AVERAGE NO. OF VEHICLES PER HOUR
Southeast Expressway at Massachusetts Avenue	
- On-ramp	792
- Off-ramp	858
Southampton Street, near Atkinson Street	642

While the percentage of truck traffic on these arteries varies somewhat by time and at specific location, 25 percent of the total vehicle traffic will typically be trucks. Based on this fraction, existing truck traffic volumes average 160 to 215 trucks per hour on these site area arteries. The truck traffic generated during

Facility construction, a maximum of 8 trucks per hour, will therefore, represent an insignificant increase over current levels.

In regard to air quality impacts, peak hourly truck traffic volumes (8) resulting from Facility construction will be less than the peak hourly volumes resulting from Facility operations (72). The air quality impact of traffic generated by Facility operations was shown to be insignificant (see Subsection 6.3). The air quality impacts from construction-related traffic will, therefore, also be insignificant.

7.4 NOISE

Construction activity will be limited to the normal daily hours of commerce, approximately 7:00 a.m. to 6:00 p.m. Construction noise will generally not be noticeable because of the masking effect of the urban background noise levels during the daytime. For brief periods during the construction phase, however, pile driving activity and steam line purging may produce extremely high noise levels, and could cause some annoyance.

Predictions of construction-related noise are summarized in Table 7.1 for each of the three sensitive community locations that were discussed previously in Subsection 6.4 of this EIR. The predictions are based on field measurements of noise generated from projects of

TABLE 7.1

PREDICTED CONSTRUCTION NOISE LEVELS
(L_{10}, dBA)

CONSTRUCTION ACTIVITY	INTRUSIVE NOISE LEVELS BY LOCATION		
	City-University Hospital Complex	South End Residential	South Boston Residential
Excavation	62	62	57
Concrete Pouring	58	58	53
Steel Erection	62	62	57
Mechanical	57	57	52
Cleanup	52	52	47

similar type and scale. The intrusive noise levels predicted at the sensitive community locations (57 to 62 dBA) are similar in magnitude to the range of background noise levels (56 to 62 dBA) currently existing at these locations on weekdays during the daytime (refer to Table 6.19). Thus, construction noise will be barely noticeable to people outdoors at the closest noise-sensitive locations.

City standards limit construction noise to a maximum intrusive noise level (L_{10}) of 75 dBA at the lot line of an affected residential or institutional property. The predicted noise level at the closest affected property (City-University Hospital complex) is 62 dBA, and well below the City construction noise standard of 75 dBA.

Heavy-duty trucks used in construction are also a source of noise. During the construction phase, trucks will access the site via the Southeast Expressway, and will not utilize local streets. Noise from construction trucks will likely be unnoticeable given the existing high noise levels from traffic on the Southeast Expressway and its ramps.

8. RESOURCE CONSERVATION

Processing solid waste to recover its energy content is, by its very nature, a means of resource conservation. When municipal solid waste is combusted, the volume of waste to be landfilled is reduced by 90 percent, thereby preserving limited landfill capacity and, in turn, conserving land for more productive use. Moreover, the resultant energy produced displaces the use of fossil fuel, thereby reducing dependence on foreign oil.

Specific resource conservation benefits from the Facility will include:

- A savings of 28,500,000 gallons of oil or 4,300 million cubic feet of natural gas per year currently used by Boston Edison to supply steam to the District Heating System and electricity to its customers.

- A savings of 280,000 gallons of diesel fuel a year as a result of reducing truck transportation for waste disposal by 1,400,000 miles each year.

To minimize water use at the Facility, resource conservation practices will include recycling wastewater and utilizing a wet/dry cooling tower.

Process wastewater will be recycled and used as makeup water, as required, to the ash quench tank, thereby minimizing Facility water needs. Utilization of a wet/dry cooling tower, although primarily included to prevent fogging and icing of nearby roadways, will also reduce water use when operated in either a dry mode or in a combined wet-dry mode by eliminating or reducing the discharge of water in both gaseous and droplet form. Also, most of the water to be used by the Facility displaces water currently used by Boston Edison. Therefore, "new" water demands are minimal.

9. PROJECT ALTERNATIVES

Alternatives to building the proposed Boston Facility for disposing of the City's solid waste are:

1. Not building the Facility and continuing the current practice of contracting with private firms for the collection and disposal of the City's waste, with dependence on disposal sites (primarily landfills) located outside of Boston.

2. Not building the Facility and arranging for disposal of the City's waste at new waste-to-energy facilities (i.e., those currently in the planning or construction stages) located outside of Boston.

3. Not building the Facility and developing a landfill located in Boston.

4. Developing and building an alternative waste-to-energy facility located in Boston (i.e., a facility at a site other than the South Bay Incinerator site, employing a technology other than mass-burning, and/or sized at other than 1,516 TPD).

In the remainder of this Section, these alternatives are compared with the proposed Boston Facility.

9.1 <u>CONTINUING CURRENT PRACTICE OF DISPOSAL AT OUTSIDE LANDFILLS</u>

The City's current collection and disposal practice has a very uncertain and costly future because it involves primary reliance on landfills located at a distance from the City. Even if enough landfill capacity continues to be available for disposal of the City's waste, this alternative is unattractive from the standpoint of economic, environmental, and resource conservation considerations.

9.1.1 FUTURE DISPOSAL CAPACITY AVAILABILITY

As described below, unlike the proposed Facility which will provide certain disposal capacity for the City's waste for at least 20 years starting in 1987, continuation of the City's current practice subjects the City to uncertain availability and/or having to seek disposal at landfills even more remote from the City than those currently used.

The City currently disposes of its household waste (approximately 250,000 TPY) at four landfills and at a waste-to-energy facility, all of which are located outside of the City. Some 72 percent of the waste goes to landfills located in Plainville, East Bridgewater, and

Amesbury, Massachusetts; and Rochester, New Hampshire. These landfills are located 25 to 80 miles (one-way) from Boston. The remaining 28 percent of the waste is disposed of at an existing waste-to-energy facility in Saugus, Massachusetts [8 miles (one-way) from Boston].

Information from DEM, Bureau of Solid Waste indicates that, by 1987 (when the Boston Facility is to be operational), most of the existing landfills in the eastern Massachusetts area will have reached their current permitted capacity.[1] There are currently 12 major commercial landfills permitted by the Commonwealth of Massachusetts that are located in the eastern part of the Commonwealth: Amesbury, Billerica, Peabody, Randolph, Cohasset, Plainville, Attleboro, East Bridgewater, Bridgewater, Halifax, Fall River, and Acushnet. By 1987, six of these landfills will have reached their current permitted capacity; four will have only 1 to 2 years of capacity remaining; and only two (Plainville and Halifax) will have significant capacity remaining. Thus, by 1987, two of the four landfills on which the City now relies (East Bridgewater and Amesbury) will be filled. Moreover, the existing waste-to-energy facility in Saugus is currently filled to capacity and, thus, does not provide a source of additional disposal capacity for Boston's waste.

As a result, it is likely that, under this alternative, the City will be forced to seek disposal at landfills even more remote from Boston, unless existing landfills are expanded once their current permitted

capacity is filled or new landfills are sited close to Boston and are available to accept waste from Boston.

9.1.2 FUTURE COSTS

As described below, continuation of the City's current practice subjects the City to significant increases in waste transportation and disposal costs. The proposed Facility, on the other hand, will provide the City with a net disposal cost in 1987 that is competitive with what the City pays today to landfill its waste and that will escalate at a slower rate over the next 20 years than will the cost of landfilling.

The City's disposal costs for collected household waste [1983-1986 (the City enters into 3-year contracts for disposal services] range between $20 and $25 per ton of waste.[2] Relative to the 1980-1983 contract period, the City's current disposal costs represent a 36-percent increase, and these costs will continue to increase as available landfill capacity diminishes. Transportation costs will increase significantly because with each landfill closure, waste will likely need to be transported to landfills located even further from the City, unless existing landfills are expanded or new landfills can be sited close to the City.

The net disposal cost to the City when Facility operations commence in 1987 will be competitive with the City's current disposal costs and will increase each year at 1/2 of the increase in a weighted inflation index. On the other hand, the most recent disposal cost increases to the City under its current disposal method are 40 percent higher than the increase in the general rate of inflation during 1980 to 1983.

9.1.3 ENVIRONMENTAL CONSIDERATIONS

As described below, the practice of long haul to distant landfills has associated environmental impacts that will be significantly reduced if the proposed Facility were to substitute for this practice. The Facility will be designed and operated in conformance with all applicable federal, Commonwealth, and City environmental regulations and standards to protect the public health and welfare.

The current practice of landfilling already involves extensive truck travel to reach the ultimate disposal site. If this practice is continued, it is likely that there will be an increase in truck miles travelled for waste disposal as the landfill disposal options available to the City become more limited and the City is forced to seek disposal at even more remote landfills. In addition to the increasing transporation costs that the City will continue to incur

under this practice, this long distance truck travel will further aggravate the region's noncompliance with the air quality standards for ozone and CO.

Relative to continued haul to the four landfills and the Saugus waste-to-energy facility now used for disposal of the City's waste, the planned Facility will reduce truck mileage by approximately 1,400,000 miles per year, in turn reducing transportation costs, truck traffic levels, fuel use, and air emissions of CO, NO_x, HC (precursors of ozone), particulates, SO_x, aldehydes, and organic acids.

In addition, with landfilling there is the potential for contamination of groundwater and drinking water supplies. While landfills are now being designed to protect against leakage and groundwater contamination (protection measures include the use of liners for leachate collection and control), the potential for contamination still exists. By significantly reducing the volume of waste requiring landfilling, the proposed Facility reduces the potential for groundwater contamination.

9.1.4 RESOURCE CONSERVATION CONSIDERATIONS

Continued landfilling at existing or new landfill sites perpetuates the practice of assigning land use for nonproductive activity. The proposed Facility will reduce the volume of waste for disposal in a

landfill by approximately 90 percent, thus decreasing the need for landfill space and allowing such land to be used for more beneficial, productive activity. Moreover, because of the significant reduction in truck travel, the proposed Facility will enable the conservation of a significant amount of the fuel that would otherwise have to be used to transport the City's waste to distant landfills.

9.1.5 SUMMARY

For the reasons described above, the City has rejected this alternative in favor of development of the proposed Facility, which represents an economically and environmentally sound means of solid waste disposal, with a certain future and with resource conservation benefits.

9.2 ARRANGING FOR DISPOSAL AT WASTE-TO-ENERGY FACILITIES LOCATED OUTSIDE OF BOSTON

Two waste-to-energy facilities are currently under construction in eastern Massachusetts, and two additional facilities are in the planning stages. For the reasons described below, these facilities cannot be counted on as a solution to the City's pressing waste disposal problem. Even if the City could arrange for disposal of a portion of its waste at an outside waste-to-energy facility, the City

would still be relying on landfills for the disposal of the rest of its waste, and, therefore, would be facing the same issues as described under Subsection 9.1. Moreover, with continued use of outside disposal sites, including waste-to-energy facilities, the City will lose the opportunity to obtain certain important economic, financial, and transportation benefits that it can only obtain through local disposal capacity.

9.2.1 FACILITIES UNDER CONSTRUCTION

Two new waste-to-energy facilities -- a 1,500-TPD mass-burning plant in North Andover and a 1,300-TPD prepared fuel/dedicated boiler plant in Haverhill/Lawrence (the waste processing and energy production systems are located at different sites) -- are currently under construction and are expected to be operational by 1986 and the end of 1984, respectively. These two facilities are located approximately 24 miles and 30 miles (one-way), respectively, from Boston. The City would, therefore, continue to incur significant transportation/transfer costs in getting its waste to either of these facilities. Moreover, both of these facilities are expected to be predominately filled to capacity by waste from communities in their respective service areas.[3]

9.2.2 FACILITIES IN THE PLANNING STAGES

Several other waste-to-energy facilities are in the planning stages -- the SEMASS project in Rochester [approximately 45 miles (one-way) from Boston], and the 128 West project in Plainville [approximately 28 miles (one-way) from Boston].

In response to its RFD, the City has received a proposal to participate in the planned SEMASS project, wherein a transfer station would be built at the site of the City's closed-down South Bay Incinerator, and the City's waste would be transported by rail to the planned facility in Rochester. This proposal did not meet the City's criterion for local disposal capacity as stated in the RFD. Moreover, after evaluating this proposal, the City deemed that the transportation network had significant technical risk such that the reliability of the waste disposal service would be uncertain.

Participation by the City in the 128 West project would involve significant transportation/transfer costs, given the distance of the planned facility from the City. Moreover, because this project is still in the planning stages, there is uncertainty regarding when and if this facility will be constructed and become operational. Finally, this facility is expected to be filled by waste from communities within its service area.

9.2.3 UNIQUE BENEFITS OF LOCAL DISPOSAL CAPACITY

A waste-to-energy facility can provide certain important benefits and advantages to the City if it is located within the Boston City limits. These benefits/advantages include the following:

1. As both the host community and the primary waste supplier, the City is:

   - Able to facilitate the successful and timely implementation of the Facility to ensure a certain solution to its pressing problem.

   - In a strong position to negotiate a Service Contract that is to its best economic advantage.

2. As the host community, the City:

   - Obtains direct financial benefits from PILOTs and from site lease payments for use of the South Bay Incineration site.

   - Obtains indirect financial benefits in that the Facility will: also make available valuable long-term disposal capacity for commercial and institutional waste generated within the City; be

a source of lower cost energy to local institutions; and provide employment opportunities during construction and operation.

3. With the Facility:

- The City avoids the added cost of having to transport its waste to an outside facility.

- The City is able to make productive use of the South Bay Incinerator site, which is currently used for storage purposes only.

- Service availability is improved because a complex transportation network is not required.

9.2.4 SUMMARY

For the reasons described above, the City has rejected this alternative in favor of development of the proposed Facility, which represents an economically and environmentally sound means of waste disposal, with a certain future and unique benefits.

9.3 DEVELOPING A LANDFILL LOCATED IN BOSTON

For reasons of environmental and resource conservation considerations (see the discussion under Subsection 9.1), the City does not wish to pursue development of a landfill in Boston. Moreover, siting a landfill in Boston will be near to impossible because of lack of adequate land and because of public concern, such that this alternative does not provide a certain solution to the City's pressing problem. Consequently, the City has rejected this alternative in favor of development of the proposed Facility, which represents an environmentally sound means of solid waste disposal, with a certain future and with economic and resource conservation benefits that cannot be obtained from a landfill.

9.4 DEVELOPING AND BUILDING AN ALTERNATIVE WASTE-TO-ENERGY FACILITY LOCATED IN BOSTON

As described below, in response to its RFD, the City received proposals for facilities in Boston at alternative sizes. However, all of the proposals received for a waste-to-energy facility in Boston employed mass-burning technology and used the South Bay Incinerator site.

9.4.1 ALTERNATIVE SIZES

Alternative facility sizes that were proposed to the City were 900, 1,200, and 1,516 TPD. A 900-TPD facility is large enough to accept the City's household waste, but not its commercial waste, still necessitating substantial landfill disposal. A 1,200-TPD facility could accept all of the City's household waste and about half of its commercial waste. A 1,500-TPD facility can accept both the City's household and most of its commercial waste, thus minimizing the need for landfilling. The size of the proposed Facility (1,516 TPD) offers the City maximum flexibility regarding capacity, as well as the most attractive economic benefits.

Moreover, a preliminary air quality impact analysis performed on various facility sizes prior to Developer selection (see Appendix E in Volume II of this EIR) demonstrated compliance in all cases and revealed no significant environmental benefits with a smaller sized facility. Consequently, there will be no difference in health effects. Other environmental impacts, including traffic and noise, will be acceptable and not noticeably different for all of the facility sizes proposed, when compared to the high existing background conditions at the South Bay Incinerator site.

9.4.2 ALTERNATIVE TECHNOLOGIES

Although the City stated in the RFD that either mass-burning or prepared fuel/dedicated boiler technologies could be proposed, the City did not receive any proposals for a waste-to-energy facility in Boston utilizing the latter technology type. Of the five proposals received, four were for a waste-to-energy facility in Boston using mass-burning technology, and one was for a transfer station in Boston with rail transportation of the City's waste to the planned SEMASS facility in Rochester. Mass-burning waste-to-energy systems have been commercially demonstrated in the United States and abroad and have more operational experience than prepared fuel technologies.

9.4.3 ALTERNATIVE SITES

All of the proposals received by the City designated the existing South Bay Incinerator site as the facility site. The proposed site does not entail a change in land use. The South Bay Incinerator site is located in an industrial/commercial area with direct access to the Southeast Expressway, thereby avoiding disruption to residential areas. The site location is also advantageous as regards its proximity to a viable, long-term energy customer -- Boston Edison. A steam transmission line to service the Boston Edison District Heating System and tie-in to the proposed expansion of the electrical substation at Andrews Square are facilitated by the existing steam

line route and proximity of the steam and electrical tie-ins to the site.

As a result of these inherent site advantages, and the fact that the detailed environmental analysis for this report indicates minimal environmental impact, the City has accepted the South Bay site for the proposed project.

9.4.4 SUMMARY

After a thorough technical, environmental, and economic evaluation of the proposals received, the City selected the APCI/BFI proposal for a 1,516-TPD mass-burning facility located at the South Bay Incinerator site (the proposed Facility).

REFERENCES

1. Telephone discussions between CSI Resource Systems, Inc., and Department of Environmental Management, Bureau of Solid Waste, September 1983.

2. Boston Waste Disposal Contracts (1983-1986).

3. (a) "Preliminary Official Statement Dated February 4, 1983, Town of North Andover, Massachusetts; Resource Recovery Revenue Bonds."

   (b) "Official Statement, Massachusetts Industrial Finance Agency, Solid Waste Revenue Bonds, May 6, 1982."

10. CIRCULATION LIST

Copies of the Draft EIR were sent to the following agencies pursuant to sections 10.06(1) and 10.07(2) of the MEPA regulations:

a. Three copies to:

Secretary
Executive Office of Environmental Affairs
Leverett Saltonstall Building
100 Cambridge Street
Boston, Massachusetts 02202

Attention: MEPA UNIT

b. One copy to:

State Clearinghouse
100 Cambridge Street - 14th Floor
Boston, Massachusetts 02202

c. One copy to:

Metropolitan Area Planning Council
110 Tremont Street
Boston, Massachusetts 02111

d. One copy to each of the following permitting agencies:

Department of Environmental Quality Engineering
1 Winter Street
Boston, Massachusetts 02108
Attention: Alecia Agan

Department of Environmental Quality Engineering
Division of Air Quality Control
Metropolitan Boston/Northeast Regional Office
323 New Boston Street
Woburn, Massachusetts 01801

Department of Environmental Quality Engineering
Division of Water Pollution Control
1 Winter Street
Boston, Massachusetts 02108

Metropolitan District Commission
Environmental Planning Office
20 Somerset Street
Boston, Massachusetts 02108

Massachusetts Aeronautics Commission
General Aviation Terminal
Logan Airport
East Boston, Massachusetts 02128

Federal Aviation Administration
New England Regional Office
12 New England Executive Park
Burlington, Massachusetts 01803

City of Boston Department of Health and Hospitals
Office of Environmental Affairs
Boston City Hospital
818 Harrison Avenue
Boston, Massachusetts 02118
Attention: Commissioner Louis Pollack

City of Boston Air Pollution Control Commission
Boston City Hall
Boston, Massachusetts 02201

Boston Redevelopment Authority
1 City Hall Square
Boston, Massachusetts 02201

Boston Water and Sewer Commission
10 Post Office Square
Boston, Massachusetts 02109
Attention: John P. Sullivan, Jr., P.E.,
Director of Engineering